The Builder.

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ILLUSTRATIONS.

Gonville and Caius College, Trinity College .....From Loggan's "Cantabrigia Illustrata."
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New Villa in China.....Messrs. Smedley, Denham, & Rose, Architects.
Wesleyan Sunday Schools, Sevenoaks.....Messrs. Potter & Harvey, Architects.
Own Country Cottage.....Mr. H. Dare Bryan, F.R.I.B.A., Architect.

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Old Illustrations at Cambridge.

THE present is a time of change, so far as the University, and therefore the town, of Cambridge, is concerned. The last thirty years have witnessed many important additions to college architecture. Besides its new court, a fine and perhaps not over-appreciated work of the younger Gilbert Scott, Pembroke is adding yet another court on the site of the master's garden, a court which will solve the question of inter-communication between the two ends of the college. Caius has a new court facing the entrance-gate in Trinity-street. The whole aspect of Downing-street has been completely altered by the erection of three or four important laboratories and science lecture-rooms. These, indeed, are but a few of the many changes which have been taking place. In consideration of these architectural developments, if for no other reason, the appearance of a book which deals with Cambridge as it was towards the end of the XVIIth century must in itself be of great interest, and when Mr. J. W. Clark's name appears on the title-page as editor one may expect a volume of more than ordinary importance.

His present work* is in the form of a reproduction of David Loggan's famous book of views, first published in 1690, which has always been regarded as one of the most accurate guides for its day. Let us say at the outset that the book should be equally acceptable to antiquarian and architect. It must only be matter for wonder that so long a time has elapsed before a new edition of Loggan's book has been given to the public.

In his introduction Mr. Clark enumerates the few facts which are known of the artist's life, and explains the plan upon which Loggan worked. Probably few more conscientious draughtsmen than David Loggan ever lived, and in the plates which Messrs. Vaus & Crampton have so successfully reproduced in half-tone, one has the opportunity of examining a remarkable combination of picturesqueness and accuracy. The fidelity of these drawings, says the author, "can be realised by anyone who will take the trouble to study even a single plate minutely. . . . His [Loggan's] extraordinary accuracy as a recorder of architectural facts cannot be appreciated as it deserves unless some college be thoroughly examined with his picture of it in one's hand. It will then be discovered that he has omitted nothing." In cases, moreover, where additions have been made and subsequently removed, several features which figure in Loggan's views have been discovered exactly as they were drawn. It would, indeed, be difficult to over-estimate the importance of these plates. They show us the colleges as they were in the closing decades of the XVIIth century.

From a general survey of Loggan's work one may obtain a very fair idea of the collegiate system. The various founders of the colleges, says Mr. Clark, "were evidently copying a large dwelling-house of the period, such as some of them were very possibly living in at the moment." The colleges themselves are all "more or less quadrangular in design," and the official buildings, such as the chapel, hall, combination-room, and library, are ranged round a court, one side of which faces a thoroughfare. Loggan's drawings, taken as most of them are from a bird's-eye view, more particularly enable one to note the varying methods adopted by the architects of succeeding ages.

The first four plates are given over the original title-page, dedication, preface, and index of views. Loggan's preface, which is given both in its original Latin form and in English, is interesting inasmuch as he is at pains therein to describe the methods adopted in the case of such a stupendous work. "To pay repeated visits to the University," says he, "and when there to submit everything to the closest examination of the mind, as well as of the eye; to observe the limitations imposed by optics as well as by geometry; to examine, from some distant point, the roofs of all the buildings . . . all the objects which the subtle art of architecture brought under my notice in the different materials which it employs; to draw them first on paper, then to engrave them properly on copper, and lastly to print them skilfully—are tasks which few know how to

* "Cantabrigia Illustrata." By David Loggan. A series of views of the University and colleges. Edited, with a life of Loggan, an introduction, and historical and descriptive notes, by J. W. Clark, M.A., Hon.Litt.D., F.S.A. Cambridge: Macmillan & Bowes, 1905.

perform, and I must confess I learnt from experience." It was Loggan's aim to show as many as possible of the buildings which went to make up the college he was drawing, and in consequence most of his views exhibit perhaps more of the roofs than one would care to see, though his drawings are of such excellence as to remove speedily enough any prejudice that might have been aroused on that ground. There is a subtle grandeur in every one of his plates.

Of the thirty engravings four are views of King's College. The famous chapel founded by Henry VI., who left such definite instructions with regard to its construction in his will, is shown from three points of view, and each of the plates is a masterpiece in its way. This is especially the case in the engraving of the interior, the mass of detail being portrayed in a truly marvellous manner. In connexion with this plate "there is a legend," says the author, "that Loggan lost his eyesight as a result of the minute work which he bestowed upon it." Fortunately there is no evidence in confirmation of this story. It is known that Loggan worked extremely slowly, and that on occasions he allowed one or more of his assistants to help him with the actual drawing; but the great mass of the work was his own, and it occupied ten years of his life. After the views of King's Chapel, the colleges are shown in the order of their foundations. Pembroke is drawn with its new chapel, one of Wren's two important works in Cambridge, and the mass of buildings in the first court, which now no longer exist. Pembroke is probably the college which has changed the most in the last two hundred years. Its old chapel has been turned into a library, Wren's chapel has been lengthened, whilst new courts have arisen on all sides. Loggan's view, showing part of Trumpington-road, is particularly interesting.

The plate of Trinity Hall is hardly so good as the others, but its fidelity cannot be doubted. The engraving of Gonville and Caius gives one an idea of a "small mediæval college before it had suffered alteration." In the centre of the foreground is the famous Gate of Honour, now made more beautiful by long ages, and to the right is seen the tree-lined avenue with the two Gates of Humility and Virtue. "The gateways," says Mr. Clark in his note, "are the earliest specimens in Cambridge of the Renaissance in stonework. They are designed with great architectural skill, and with that singular attention to symbolism which characterised the reign of Elizabeth." It is of interest to note that in this plate Loggan has been caught "tripping," for in the foreground figure a cart and horses traversing a road, which could not have been in existence at the time.

In all probability King's College and that at Eton were designed by the same person. The stone used for both foundations, as Mr. Clark has remarked in another book, was quarried "at their joint expense, and then divided between them." One is glad, therefore, to see that Loggan includes a view of Eton. He bestows two plates on St. John's College, the first of which, taken from the front, may be said to be one of the most successful of the series. The three courts, one behind the other, are shown in quaint perspective. The two gates at the entrance to the second and third courts—the latter designed by the Ralph Symonds who afterwards worked on the Great Court of Trinity—are drawn with their four-angle turrets and wealth of ornamentation. The artist shares in the common admiration of that most wonderful of all colleges, Trinity. Three of his plates are given to this college, one a bird's-eye view of the whole, another of Nevile's court, one of the most beautiful in Cambridge, and containing the library, which must be considered one of Wren's most successful works, and a third of the Bishop's Hostel, "which has preserved its original features with but little alteration," in spite of several additions in its near neighbourhood. Mr. Clark calls attention to the irregularity of the Great Court, but adds that "notwithstanding these peculiarities, perhaps in consequence of them, the whole has a singularly picturesque and harmonious effect." We should be inclined to think that the great size of the court would prevent the eye from noting any irregularities save, indeed, the variety of design in chapel, hall, master's lodge, and college rooms. The fountain is not in the centre of the court, but it appears to be so. As Mr. Clark says, there is harmony, and Loggan has obtained this quality in his illustration.

In addition to these views there are included plates of the town, the map of Cambridge executed by John Hammond, and a fine portrait of the Duke of Somerset, who was Chancellor of the University from 1689 to 1748. Mr. Clark is to be congratulated on a successful attempt to bring Loggan's work before a larger public. The "Cantabrigia Illustrata" comes as a fitting addition to the author's previous labours in the architectural history of the town and University. The book cannot fail to please those who are ready to appreciate fine, delicate, and accurate work of an age when the engraver's art was greatly neglected. We should welcome a similar reproduction of Loggan's companion work—first published in 1675—on the sister University.

ON SOME THAMES BRIDGES.

By E. S. ROSCOE.

ONE is constantly prone to forget that what we call general history is only the result of, in many instances, local incidents; so that if one is acquainted with the local history of this or that place we probably realise more vividly history in its larger aspects. Passing down the Thames on a summer day one notes with pleasure the extending length of Abingdon Bridge, losing itself as it were in the Culham meadows, and the agreeable outlines of Henley Bridge, which so many of us have known from boyhood. One may not recollect, however, that these and other bridges are not only local landmarks, but that they mark and exemplify also incidents in the social history of this country. Godstow, Oxford, Abingdon, Culham, Clifton Hampden, Wallingford, Henley, Maidenhead, and Richmond—how many memories of different ages they recall of old ferries across a river now placid and now rippling over gravelly banks, once the haunt of the salmon and the trout; of the enterprise of the countryside, sick of detention in winter floods, resulting in structures illustrative of growing national prosperity, which, while primarily utilitarian, were always picturesque! In this iron age we span the Thames, even at its choicest parts, even by Windsor itself, with bridges which, however useful, have no harmonies of colour, and are antagonistic to their surroundings.

The two choicest of the Upper Thames bridges are those of Abingdon and Henley, which illustrate the efforts and the art of two widely different ages, the XVth and the XVIIIth centuries. Each bridge has its own special attractions, each is typical of its time, of the history of each we know something definite. The narrow roadway, the small arches, the sturdy pointed piers of Abingdon Bridge tell us of a time when construction was not easy, when the river ran down its course with impetuosity, when the creation of such a structure was a very notable deed. In the hall of the ancient almshouses which are so delightful a feature of Abingdon one may see depicted the building of the bridge in 1416, of stone presented by Sir Peter Besil, of Besileigh, a place which lay on the high ground between Oxford and Abingdon. One thousand marks towards the cost of the bridge were supplied by Geoffrey Barber, a rich burgher of Abingdon, who stands in the foreground of the picture counting out the money to be paid to the workmen, who, in the background, are toiling at their labour, which the benefactors and the great men of the place are supervising. It was a pious and a useful work:—

"Another blessed besines is brigges to make,"

as the old verses preserved in the same old buildings say, telling us, too, how the aforesaid Sir Peter gave the materials for the sake of his father's soul and his friends; and how the women came to the river-side to watch the work, and how everyone rejoiced at the comfort of crossing the river dryshod. It was a memorable event this when,

"King Henry the Fifth in the fifth year of his reign,
At Burford and Culham did bridges build twain."

In those days, too, there were no highway boards and district councils, and the Guild of St. Helen, a religious foundation, was entrusted with the care of these bridges, and of the adjacent roads, exemplifying once again the fact that the architects and engineers of the age, the builders of bridges as well as of cathedrals, were ecclesiastics.

Thus in Abingdon Bridge we see an example of the energy of the age, and we may even realise the difficulties of life on the Thames side when for long periods in the winter the crossing of the river was very difficult, and often very dangerous.

Godstow Bridge and Folly Bridge at Oxford have some of the same interest as Abingdon and Culham Bridges; but only a small part of Godstow Bridge is mediæval. Folly Bridge has lost its ancient characteristics, being now only of three arches built in 1825 and 1827;

it was in days gone by a roadway over a series of forty arches, and was well named "Grand Pont." It was more than a bridge over the Isis; it was really a causeway over a space of marsh and muddy shallows, ranging in depth of water according to the season. Tradition hangs still about the place. Roger Bacon lived in the Gatehouse, and stories exist of him; in another the Abbot of Abingdon took toll.

In the small modern bridge, not unsightly, we can see nothing of these past days, and it remains in most of our memories the background to Salter's raft, with its boats and its cheery occupants.

Most people who know the Upper Thames recollect the picturesque bit of river-scenery at Clifton Hampden, a few miles below Abingdon, the warm-coloured and pleasant brick bridge being a marked feature in the landscape. This shows that a bridge to harmonise with English scenery need not necessarily be mediæval or even of the XVIIIth century, for Clifton Hampden belongs to the Early Victorian period, having been built about 1840, primarily at the cost of the present Lord Aldenham.

If, however, we want to find a bridge to compare with Abingdon in interest, unquestionably we must go lower down the river to Henley. Many who are not lovers of the Thames have seen this delightful memorial of the XVIIIth century. There were evidently warm local discussions on the subject of a new bridge in the autumn of 1781, in which year an Act of Parliament had been passed to authorise the new structure in place of the old bridge, which, being unsafe, was finally swept away by an abnormal flood in 1774; for Horace Walpole writes, in September 16, to General Conway, the owner of Park Place, referring to something he had told him of a meeting at Henley:—"You have temper and patience enough to bear with fools and false talk." Evidently Conway's wishes prevailed, for not only was a beginning made with the bridge, of which one William Hayward was the designer (though he died before the work was begun), but by 1784 it was nearing completion, and Walpole tells us in one of his letters that "Mrs. Damer herself is modelling two masks for the key-stones of the new bridge." Mrs. Damer was the accomplished daughter of Conway. In 1785 casts of these heads were exhibited at the Royal Academy, and by the autumn of that year the bridge was nearly completed; again we hear of it from Walpole. "We saw," he writes in August, "the new bridge at Henley, which is completed on one side, and is most beautiful, the bend of the arch was regulated by General Conway himself, in three centres, and for grace does not veil the bonnet to the Porte del Tremlà at Florence." Walpole visited Conway so often that his letters form a kind of diary of the progress of the bridge, for next year he again writes: "I have seen the delight of my eyes, the new bridge at Henley." Walpole is too often regarded as a shallow and fanciful dilletante; but, on the contrary, beneath some mannerisms and affectation lay a keen intellect and a true taste. He concludes the same letter by saying that this bridge "traverses a river a thousand times more beautiful" than the Tiber. After such a bit of enthusiasm Walpole cannot be accused of want of appreciation of a peculiarly charming but thoroughly quiet bit of English scenery, and in his appreciation of it he shows how modern in intellectual taste he is compared to many of his contemporaries.

As we pass under the agreeable grey arches of Henley Bridge, or shelter, it may be, beneath them from sun or rain, we ought to recall the scenes of which these extracts remind us, and the various characters, by no means unimportant in the society of the XVIIIth century, who were interested in its building. Maidenhead Bridge, built in 1772, is of the same type and construction as Henley, but it has not attached to it the personal interest which belongs to the other, though we can hardly say with a certain Mr. Powys that:—

"Our English rivers claim superior praise
From Damer's sculpture and from Denham's lays."

Something might be told of Wallingford, a famous mediæval structure, of which now next to nothing is left, for it was badly damaged by the Parliamentary forces at the siege of Wallingford in 1646, and in 1809 the three centre arches were entirely rebuilt. Shillingford, too, ought not to be forgotten, for it brings up pleasant memories of summer evenings, of holiday trips down the river, but we must pass on to Richmond, which, as is fitting, has a bridge built in the XVIIIth century, for the place is crowded with memories of that age, of the Duke of Queensberry ("Old Q."), whose agreeable villa was by the river's side, of the Castle Inn with its gay company, and its landlady, Mrs. Forty, who was the cause of Sheridan's celebrated toast at the Regent's dinner-table, "Fair, fat, and Forty." We are reminded, too, of the French Emigrés, of Madame de Boufflers, and the other brilliant persons who passed part of their exile not without pleasure on the river, of the fashionable Richmond of which Walpole once wrote that it "is in the first request this summer."

It is a little strange that it was not until 1774 that a commencement was made with the new bridge, resulting in its completion in 1777. For centuries Richmond Ferry had been one of the most frequented of river crossings; perhaps it was for that very reason that a bridge was so long in coming, for the owner of the ferry had a valuable vested interest. The bridge was designed by two now little-known architects, Paine and Couse, and cost 26,000*l*. If without striking features, it is yet dignified and pleasant in design, and was happily described by a contemporary bard who wrote of it with more truth than style:—

"No useless glaring ornaments offend."

Placed as it is in so agreeable and even striking a situation, Richmond Bridge tends to increase the charm of a delightful piece of Thames scenery, and for its erection we may offer thanks to our sensible XVIIIth century forefathers.

THE INCORPORATED INSTITUTE OF BRITISH DECORATORS have awarded their gold medal to Sir William Richmond, R.A., in recognition of his having carried out in St. Paul's Cathedral the most important work of coloured decoration executed in this country in modern times.

THE TRADES DISPUTES BILL.

THE proceedings on the Committee stage of the Trades Disputes Bill were such a foregone conclusion that the principal interest in the debate centres in the acrobatic feats performed by certain members of the Government in the performance of their great *volte face*. The Chancellor of the Exchequer sought to justify his change of opinion by saying that he could not be content unless the employers and workmen's unions were placed on equality, and that the new clause accomplished this; moreover, he endeavoured to give himself courage in the adoption of the new policy, that trade unions can do no wrong, by expressing his opinion that trade unions could now be trusted not to wish to do wrong. Was ever legislation based on such reasoning? If an improvement is apparent in the morals and manners of the nation, is that a reason for repealing all laws? Clause 4 of the Bill, subject to the Attorney-General giving the matter further consideration as to whether it cannot still be flavoured a little more to the liking of the Labour members, now stands thus: "An action against a trade union, whether of workmen or masters, or against any members thereof (or officials thereof), on behalf of themselves and all other members of the trade union for the recovery of damages in respect of any tortious act alleged to have been committed by or on behalf of the trade union, shall not be entertained by any Court, provided that nothing in this section shall affect the liability of the trustees of such unions to be sued in the events provided for by the Trades Union Act, 1871, sect. 9."

This section referred to enables trade unions to protect or defend their rights in respect of the real and personal property of the unions. How is equality secured in any real sense between employers and workmen by this clause which the Government has itself described as a piece of undesirable class legislation? If an employer is not a member of a union, apparently his property can be destroyed by the trade union and he be left without any pecuniary remedy. The good sense of the nation and of the working classes in particular is not likely to leave a measure drawn in such terms long on the Statute Book, even if it ever attains that position. The argument that for thirty years the trade unions were not supposed to have their funds made liable for their wrongful acts does not apply to deliberate legislation creating an immunity from responsibility for their actions. The result of such legislation is likely to encourage trade disputes, to encourage co-operation of trade trusts, and to sow strife between the bodies so created.

Clause 3 was also amended to the effect that an act done in furtherance of a trade dispute shall not be actionable if it enables a person to break a contract, in addition to the words relating to interference with trade; the only amendments receiving any consideration being those of Labour members. The history of the Trades Disputes Bill is, so far, unique, but is the policy of irresponsibility it introduces likely long to remain limited to trade unions?

NOTES.

Labour Disputes.

THE Board of Trade Report on strikes and lockouts has just been published, and the figures given in its pages still show a fairly satisfactory condition in the relations of employers and labour, though not quite so good as last year, but that year, as we pointed out in our issue for August 12, 1905, was a record year. The number of disputes was about the same as in 1904, but the number of working days lost exceeded that of the previous year. The working days lost amounted to 2½ million days, but the average number of days lost in the five years 1900 to 1904 exceeded this figure by some 400,000 days, and in the previous five years, 1895-1899, the number of working days lost averaged two-thirds more than in the year under review. This diminution in strikes and lockouts we attribute largely to the responsibility placed on the union funds of late years, and we earnestly trust that the promised legislation will not have the effect of again disturbing the better relations existing between capital and labour. One unsatisfactory feature disclosed in this last report was that the number of disputes arising out of refusals of union men to work with non-union men showed an increase. One-fifth of the total number of people affected by trades disputes appear to have been thrown out of work owing to controversies arising out of trade union principles.

The Channel Tunnel.

AN article in a French contemporary by M. Albert Sartiaux, chief engineer to the Chemin de Fer du Nord, gives voice to the undoubtedly strong feeling entertained by our neighbours concerning the desirability of the Channel Tunnel as an encouragement to trade and industry and to the development of those friendly relations which conduce to the peace of the world. Some statistics given by M. Sartiaux come rather as a surprise. For example, he shows that while 1,200,000 Englishmen annually visit the Continent, more than 3,500,000 passengers travel from Paris alone to Northern Germany and Belgium, or about three times the number conveyed from the whole of England to the Continent. These figures appear to dispose of the theory that Frenchmen do not travel abroad so much as Englishmen, and the suggestion is that the sea journey frightens our neighbours away from this country. We are inclined to think that the question of language has more to do with the comparatively small number of French visitors to Great Britain than the dread of an hour's trip on the sea. If, however, it can be shown that the tunnel would encourage the interchange of traffic between the two countries, that would be a powerful argument in its favour. But we are not yet in a position to indorse the opinion expressed by M. Sartiaux that "there is no longer any possible doubt as to the technical success of the undertaking." We understand that Sir Douglas Fox is now preparing plans of the undertaking for the British promoters, but until it has been absolutely proved that no geological faults exist along the proposed line of communication, it cannot be asserted positively that the scheme is practicable.

Metropolitan Water Supply.

REFERRING to the great benefits conferred on the world by bacteriology, the President of the British Association remarked in the course of his address that by its aid London, using its natural "but inevitably contaminated sources of water supply, has enjoyed a long immunity from waterborne epidemics." This is quite true, yet while monthly reports show that the water as supplied to the metropolis is reasonably pure, it would be more satisfactory if the raw material, so to speak, could be derived from uncontaminated sources like those possessed by Manchester, Liverpool, Birmingham, Glasgow, and other great cities. The recent refusal of a Parliamentary Committee to sanction the proposals of the Yarmouth and Lowestoft water companies to abstract further supplies from the River Bure has been used by Sir Alexander Binnie as the text for "a note of warning on the present condition of our London water supply." Of course we all know that its sources are contaminated, but it is not correct to suggest that the water supply itself is unfitted for modern requirements. Sir Alexander was identified with the Welsh water supply scheme of the London County Council, and no doubt believes that a similar project should be undertaken by the Metropolitan Water Board. At present, however much we may sympathise with the idea in the abstract, there does not seem to be a state of urgency such as would justify the sacrifice of existing waterworks, and the enormous expenditure involved in the acquisition of gathering grounds, the formation of storage reservoirs in Wales, and the construction of aqueducts from that country to London.

The Holborn Gas Explosion.

THE inquest opened last week on the body of a gasfitter employed by the Gas Light & Coke Company serves the purpose of directing attention once more to the risks which are needlessly incurred by some men who have to deal with the repair of defective gas pipes and fittings. In this particular case an escape of gas was noticed in the stables of a firm of cartage contractors in Holborn, and was reported by the horse foreman to the gas company, who sent three men to attend to the matter. It has not yet been stated what steps were actually taken in the way of repairs, as one man was killed by the explosion and the other two were so seriously injured that, if they ultimately recover, they will not be able to give evidence for at least two months. The point is made clear, however, that the gas was not shut off while the piping was being repaired, and the result was an explosion which wrecked the building, killed one workman, injured the two other workmen, and also injured the wife and child of the yard foreman. It is really extraordinary that gasfitters are still to be found who are unaware or heedless of the fact that coal gas and air form a highly explosive mixture. How it comes about that men thus ignorant or reckless are employed by important gas companies is a matter that quite passes comprehension.

Workmen's Compensation.

THE case of Neale *v.* The Electric and Ordinance Accessories Company, Ltd., reported in our issue of last week, draws attention to another of the cases of hardship which may arise under the Workmen's Compensation Act. The plaintiff was an infant, a boy of fifteen suing by his next friend, and the action was brought against the defendants, his employers, in respect of personal injuries sustained by the boy, as was alleged, in consequence of the defendants having neglected to fence their machinery in accordance with the provisions of the Factory and Workshop Act, 1901. The action however failed, and the jury returned a verdict for the defendants. The plaintiff's counsel then applied to the judge for compensation under the Workmen's Compensation Act, acting under the provisions of sect. 1, subsect. 4, which gives the plaintiff the opportunity of still obtaining compensation after it has been determined in the action that the employer is not liable in damages as apart from compensation. The judge then made an award in the plaintiff's favour for 3s. 6d. a week. Subsequently an application was made to the Court of Appeal for a new trial of the action, but the plaintiff was held to be debarred from obtaining this, since by asking for compensation at the original trial he had exerted the option given to him by sect. 1, subsect. 2 (*b*) of the Workmen's Compensation Act, and therefore could no longer proceed for damages independently of that Act. The hardship involved by this decision is that since the courts have held in the case of Edwards *v.* Godfrey that the application for compensation under sect. 2, subsect. 4 must be made immediately the action for damages is dismissed, this involves the workman then and there exerting his option under the Act. In a recent case three new trials were granted in one action, and at the third application a Divisional Court was strongly of opinion that there was evidence of negligence, and that the action for damages had twice been wrongly decided. We consider that the Legislature can hardly have contemplated the effect subsect. 2 (*b*) would have on subsect. 4, and as no change has so far been made in these sections by the new Bill on this point, we think the attention of the Legislature should at once be drawn to a very real hardship.

Coast Erosion.

THE paper contributed by Mr. Clement Reid to the Geographical Section of the British Association covers the chief points to be considered in connexion with the subject of coast erosion, and brings into prominence the necessity for studying the history of our coastline for at least a thousand years back. When the question is examined in conjunction with the deposition of the material eroded from cliffs, it is found that erosion has been by no means a continuous process. The rapid accumulation of material in certain parts of the east and

south coasts of England indicates that attacks by the sea first became marked at a definite date, before which the physical conditions were very different from those now existing. Some 3,000 or 4,000 years ago the sea level was probably about 60 ft. lower in relation to the land than it is to-day, and instead of being cut into cliffs as they now are in many parts along the south coast, the Downs were formerly separated from the sea by a wide plain, of which portions still remain. Mr. Reid suggests that the rise of the sea level may have been completed about 3,500 years ago, and that whatever was its exact date that consummation forms the natural starting-point of present investigations. At first rapid the progress of erosion was presently arrested by the collection of *débris*, in the form of sand and shingle, which are our most efficient safeguards against further inroads. The continued removal of beach material by private and public landowners, and its interception on a large scale by landowners and municipal authorities, constitute serious menaces to the owners of adjacent lands, and show the necessity for a central authority to whom all proposals for dealing with beach material and all coast protection schemes should be referred.

The Right to Air.

IT is seldom that a case in regard to the right to air comes before the Court, but this happened at the recent assizes at Swansea, and Mr. Justice Jelf has just delivered a judgment on this subject. In so doing he has taken occasion, rightly enough, to emphasise the fact that the right to light and air are separate. In the present case he held that there had been such an interference with the air coming to the plaintiff's premises as to justify him in awarding 200*l*. damages. The obstructing walls made the plaintiff's back yard "like a box with the lid off." The weak part of the judgment is the admission that there was doubt "if physically less air than formerly entered the plaintiff's windows"; in other words the obstructions made the atmosphere more "stuffy." But if there is no current of air though a window, obviously less fresh air enters a room, so that we are inclined to think that this admission of the judge was hardly in accordance with his previous finding that there had been a stoppage of the air. The real test is whether an obstruction has caused a legal nuisance, and it is on this broad ground alone that this question can be settled as a matter of fact.

Motor-Cars *v.* Trains.

NOT only the long-suffering shareholder, but also the man in the street, has been looking out for the remarks of the railway chairmen on this subject at the half-yearly meetings. "We motorists," says the writer of "Motor Notes" in a daily contemporary, "have often warned the railway companies of the approaching severe competition they must suffer from the car." Very considerate this, but savouring of supererogation. The severity of the competition is being recognised and acknowledged—though without undue pessimism—at most of the half-yearly meetings. The concrete case mentioned by the chairman of the London and South-Western, however, illustrates the position very forcibly, and emphasises the serious aspect of the subject for lines depending chiefly upon passenger traffic for their prosperity. It appears that during the four days of Ascot week no fewer than 2,012 cars were counted there—most of them having conveyed "first-class fares" in varying numbers—undoubtedly representing an appreciable loss of income to the railway company. The chairman of the Great Eastern, in more general terms, spoke of the reality and severity of the tram and car competition; but almost side by side with his remarks appeared a paragraph suggestive of an occasional set-off. A car belonging to a well-known actress came to grief near an out-of-the-way Great Eastern station, and it cost the lady 32*l*. for a special train to convey her and her friends to their destination.

Damages for Compulsory Purchase.

THE case of The King *v.* Mountford; *ex parte* The London United Tramways (1901), Ltd., raised a question of some importance to dwellers in cities. The tramway company had Parliamentary powers to lay tramways down certain streets in Kingston, but by their Act they were compelled to widen certain portions of the roadway before opening the lines for traffic. The company, for the purpose of the street widening, had acquired a portion of certain premises held on lease by Mr. Mountford, a dentist, but no part of the tramway was laid on any part of the land acquired from him. In proceedings for compensation under sect. 3 of the Lands Clauses Consolidation Act, 1845, the jury had awarded 360*l*. in respect of the land taken, and 400*l*. for injurious affection of the premises retained by Mr. Mountford, including loss of goodwill in his business. An application was made to the Court to quash this latter finding of the jury, and the application was successful. The Court appear to have held that the first sum included the injurious affection of the land left, including damages for the passage of the ordinary traffic nearer to his house, and that any further inconvenience was only suffered in common with the other inhabitants of the street; but the Court also were of opinion that had any portion of the land taken been used by the tramway company for the purposes of the undertaking, then the second head of damages would have been recoverable. The Court intimated some doubt in giving their decision, and the question involved is one of considerable difficulty. The principle governing these cases is that where an owner has lost his right to veto an undertaking by reason of the exercise of compulsory powers the compensation should be such as a willing seller might have been expected to stipulate for; but the difficulty in administering it satisfactorily would appear to be that one owner who had sold a foot or two of land might be placed in a far more advantageous position than his neighbours. All the same, since both the private Act of the company and the Lands Clauses Consolidation Act contemplate an owner being compensated for severance, it may be a question whether any limitation can be placed on these provisions, by a consideration such as the above, and the distinction between the two uses the land was put to, seems unsatisfactory.

Thorney Abbey, Isle of Ely.

WE read that by reason of the dangerous condition of the roof the Abbey church is closed for repairs. Thorney, first known as Ankeridge, was established on the elevated Drift and Lower Green Sand by the Morris and Fish Fens in the north-western parts of the Isle of Ely for some anchorites by Saxulph, first Abbot of Medehamstede (Peterborough), aided by Wulfhere, lord of Mercia, and brother of Peadha, the reputed founder of the latter monastery. After having been pillaged and burned by the Danes Thorney was, together with Ely, refounded by Æthelwold, Bishop of Winchester, and dedicated to St. Mary the Virgin, A.D. 972, for Benedictines whose abbots attained to high eminence and sat in Parliament. King John granted the patronage of Thorney to Eustace, Bishop of Ely, and his successors. In 26 Henry VIII. the revenues were computed to be 508*l*. 12s. 5d. per annum, *teste* Speed; Dugdale says they amounted to 411*l*. 12s. 11d. Edward VI. bestowed most of that property, with the site, upon John, first Earl of Bedford. The Russells continued the monks' labours, eulogised by William of Malmesbury, of draining and cultivating their low-lying lands; the enterprise is commemorated by the "Great Bedford Level," in the construction of which Cornelius Vermuyden played a part. The church had been rebuilt in 1128; in 1638 the nave was converted into the parish church. Some reparation of the fabric in 1652 is attributed to Inigo Jones. Blore enlarged the church about sixty-five years ago for the Duke of Bedford, in whose honour the tenantry, largely descended from Walloon and French *émigrés*, subscribed for a fine organ. The district around had been held by the Iceni, whose chief town was at Norwich. The Britons maintained their stand there until the Gyrwas from Engle-land dispossessed them in the middle of the VIth century: In the neighbouring fens Hereward the Wake and Morkere, Earl of Northumbria, made their last resistance against William the Conqueror.

THE QUEEN VICTORIA NURSING INSTITUTE, READING.—This institute, which was opened recently, consists of two houses in Abbot's-walk, which have been converted into one, affording accommodation for ten bedrooms. The work has been carried out by Messrs. Collier & Catley, and Messrs. Boyd & Murley (painting), under the supervision of Mr. W. Ravenscroft, F.S.A., of Reading.

LIQUID AIR.—The establishment opened at Battersea last week by Major Baden-Powell is said to be the first plant in any country where liquid air has been produced at so low a price that it can be used freely in industrial work. We may point out, however, that at Los Angeles, in America, liquid air and oxygen are being produced on a commercial scale, and that in Germany liquid air is sold at a price which permits it to be used as a substitute for ice. No chemicals are necessary in the process of production, and it is stated that the liquid will be supplied at the small cost of 5s. per gallon. Those interested in the industry expect that the product will be used for many purposes, including the operation of prime movers. If it could be applied successfully to motor vehicles instead of the familiar but odorous petrol, the public would have much reason for gratitude.

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THE ROYAL ARCHÆOLOGICAL INSTITUTE AT WORCESTER.

(Continued from page 171.)

Friday, July 27.

THIS day was devoted to an examination of certain architectural antiquities in Worcester itself. The party assembled at 10 o'clock at St. Wolstan's Hospital, more generally known as the Commandery, which was inspected under the guidance of Mr. Littlebury. The chief feature of the building is the fine timber hall of the XVth century, with open roof, and considerable remains of its original quarry glazing, with quaint figures of birds. A visit was next paid to the cathedral church, where Mr. Hope pointed out the various changes described by him on the preceding evening. After luncheon the monastic buildings were inspected, Mr. Hope having first explained in the chapter-house the general disposition of them, as illustrated by the Parliamentary Survey of 1649, at which date all were still standing. From the minute descriptions of the various prebendal houses given in the survey, it was possible to lay down the exact limits and relative positions of the important western block, which contained the monks' dorter and the infirmary, with the vice-dorter between. The inspection of the buildings concluded with a visit to the ancient bishop's palace, now the deanery, where the members were hospitably entertained by the Dean of Worcester and Mrs. Forrest. Though outwardly of no great interest, marked as it is by a XVIIIth century front, the building is one deserving of careful examination, and contains an elaborate series of vaulted undercrofts of the XIIIth and XIVth centuries, below the great hall, chapel, etc., which indicate the original disposition of the chambers over them.

At the evening meeting Mr. J. W. Willis Bund read a paper, illustrated by plans and lantern slides, on "The Evolution of Worcester," from the earliest times down to its condition as a walled town in the Norman period. He also called attention to the danger threatening the few remaining old timber houses in the city, owing to their insanitary condition, which empowered the Corporation, under certain circumstances, to compel first their closing and then their demolition.

Saturday, July 28.

This day was devoted to visits to Ledbury and Malvern. Leaving Worcester at 9.35 a.m. the party reached Ledbury at 10.30 and proceeded to the parish church, the chief features of which were lucidly pointed out by the Rev. Prebendary Maddison Green. The church was originally a cruciform structure of early XIIth century work, but, owing apparently to the fall of the tower, was largely rebuilt about 1170, and extended eastwards and westwards to its present length. The aisles have been enlarged, the north in the XIIIth century and the south in the XIVth century, and *temp.* Edward II. a fine and large chapel, richly decorated with bell-tower, was built out north of the chancel. A two-storied vestry and porch were also added about the same time. The tower is a detached structure, c. 1200, to the north of the church, with a later upper story and modern stone spire. A visit was next paid to the Hospital of St. Katharine. This was founded in 1232 by Hugh Foliot, Bishop of Hereford, for a master, and divers poor brethren and sisters, but refounded by Queen Elizabeth in 1580. Most of the present buildings are modern, but the chapel is of the time of the first foundation, and had the hall in line with it to the west. The latter has been subdivided, and much altered, but the chapel retains a fine open roof of the XIVth century, when some of the windows were enlarged, and a good deal of rich flooring, with the tiles disposed in their original patterns.

After luncheon carriages were in readiness to convey the party to Little Malvern priory church, which was described by Mr. C. R. Peers. The priory was a cell of Worcester, founded in 1171, and the church of that date was apparently a cruciform structure with a north aisle only to the nave. The existing remains belong to a reconstruction in the XIVth century, and include the central tower and presbytery, which form the present parish church, with north and south transepts and chapels east of them, all now in ruins. The east end was altered by Bishop Alcock before his translation to Ely in 1486, and in the east window, which contains his arms, are the kneeling figures of Arthur, Prince of Wales, his mother, Queen Elizabeth of York, and his consort, the Lady Katharine of Aragon. The figure of King Henry VII. has been destroyed. The date of this glass, which is by the same hand as some of the later glass at Great Malvern, must belong to the period between the marriage of Prince Arthur, in November, 1501, and his death in the April following. The nave of the church has been destroyed, as well as two sides of the claustral buildings, but the western range, much altered, exists as a modern residence.

The journey was next resumed to Great Malvern, where the priory church was described by the vicar, the Rev. Canon Pelly. After inspecting the fine series of wall tiles and the rich collection of old stained glass the party returned by train to Worcester.

Monday, July 30.

Visits were paid to Evesham and Pershore, the party numbering about a hundred. On arrival at Evesham a halt was first made at the town hall, where the mayor received the members and exhibited the maces, plate, and charters. The site of the Benedictine abbey was next inspected under the guidance of Mr. C. R. Peers, who referred to the excavations carried out by Mr. Rudge early in the XIXth century, which had brought to light the plan and crypt of this great church. Of this only a fragment of the north transept remains above ground. The abbey buildings have also totally disappeared, with the exception of the richly-decorated arch from the cloister into the ten-sided chapter-house and some minor buildings near the great gate. Abbot Lichfield's fine bell-tower, which served also as a gatehouse between the cemeteries of the layfolk and the monks, is still perfect, and there are some interesting remains of the Norman gatehouse through which the outer cemetery was reached from the town. Within this cemetery are two parish churches, both of them in use. The most noteworthy feature in each is a small chantry chapel of the XVIth century, with rich fan vaulting.

Carriages being in readiness, the members of the Institute then drove to Pershore. After luncheon a visit was paid to this abbey church, which was described by Mr. C. R. Peers. The building to which the present remains belong was begun about 1100, but only the south transept and crossing remain. The north transept and the nave, which must have resembled that of Tewkesbury, were destroyed at the suppression of the abbey, and the eastern limb rebuilt in the XIIIth century. This later work is not, however, all of one date. The eastern chapels, including the destroyed lady chapel, were begun to the east of the Norman presbytery about 1210; the presbytery itself was rebuilt after a fire in 1223, and its vault, together with the upper part of the tower was added after another fire in 1288. Mr. Peers pointed out that for some reason, probably structural, the tower had never been carried up to its intended height, and many of its details were still left in block only. There are traces of a large early XIVth century chapel eastward of the south transept. The whole of the claustral buildings have been swept away. Before leaving the church the President of the Institute called upon M. Eugène Lefevre-Pontalis, President of the Société Française d'Archéologie, who, with several of his countrymen, had honoured the meeting by their presence.

M. Eugène Lefevre-Pontalis, speaking in French, first thanked the President and members of the Institute for their cordial reception of himself and his *confrère*, M. Louis Serbat, the Secretary of his Society. He then commented in the most interesting manner on the similarity between the architecture of England and Normandy in the first half of the XIIIth century, the same preference for delicate and refined mouldings, the same complicated plans of pillars, the same clearstory passages, and the same forms in the windows, instancing the choir of St. Étienne of Caen, the cathedral churches of Lisieux and Coutances, etc. In speaking of the same preference for complicated mouldings, he noticed the early appearance of the fillet on shafts and rolls of arch mouldings, which has been attributed by certain French archæologists to the XIVth century. In the last quarter of the XIIth century the architecture of England began to separate itself from that of Normandy, especially in the vaults. English architecture continued its preference for complicated forms by the free introduction of tiercerons and liernes, and then by the introduction of curves of contra-flexure in wondow tracery, which anticipated the introduction of the Flamboyant style of France. At the same time he confessed to a preference for the XIVth century Gothic of the continent, as illustrated by the magnificent church of St. Ouen at Rouen. He considered the choir of Pershore to be of fine style, comprising delicacy of detail with impression of stability. He finished a very interesting address by inviting the members of the Institute to take part in the Congress of his Society at Avallon and Auxern next year, and with the hope that English and French archæologists would continue the *entente cordiale archéologique* by the comparative study of the architecture of the two countries. He also alluded to the *entente cordiale* of former times between his predecessors, M. de Caumont, M. Ferdinand de Lesteyrie, etc., and Sir Augustus W. Franks, Mr. J. H. Parker, and others.

The party were after received to tea by Mr. and Mrs. Pearce in their interesting house of the Adam period, and subsequently returned by train to Worcester.

In the evening the members of the Institute were present at a conversazione at the Shire Hall, by invitation of Mr. J. W. Willis Bund, Chairman of the Worcestershire County Council, who showed his guests an interesting series of lantern slides illustrative of the various types of churches, ancient houses, bridges, and other architectural antiquities characteristic of the county.

Tuesday, July 31.

This was the concluding day of the meeting. Leaving Worcester at 9.25, the party journeyed by special rail-motor to Toddington, and thence in carriages to Stanway. Here the manor-house, a good example of Elizabethan work with forecourt and gatehouse, was first inspected. A visit was next paid to the parish church. This consisted originally of a simple chancel and nave of the XIIth century, but later windows have been inserted and a tower added at the west end. The journey was next continued to Hayles, where the party were received by Mr. Hugh Andrews, the owner of the site of the abbey, and the remains of the church, etc., examined, under the guidance of Mr. Harold Brakspear. The abbey was one of Cistercian monks, founded in 1245 by Richard, King of the Romans, with a church of similar type to that of Abbey Dore. Between 1271 and 1277 the church was enlarged eastwards for the enshrining of the famous relic of the Holy Blood, by building out an apsidal chapel for the shrine, with an enriching ambulatory and external chevet of five polygonal chapels. Only a fragment of the south wall of the nave remains above ground, but the foundations were excavated a few years ago by the Bristol and Gloucestershire Archæological Society, and the complete plan recovered. Some fragments are left of a late Tudor rebuilding of the cloister alleys, but the rest of the buildings still await investigation with pick and spade. In an adjacent museum are preserved a large number of fragments of splendid tombs, architectural remains, and paving tiles found during the excavations. Some remarks on the Holy Blood of Hayles were contributed by Mr. St. Clair Baddeley and Mr. Micklethwaite. After an inspection of the parish church, an interesting building with some lately-discovered early wall paintings, the journey was continued to Winchcombe. After luncheon a visit was paid to the parish church of Winchcombe, where the vicar, the Rev. Dr. Taylor, displayed the interesting church plate and registers and some fragments and tiles from the destroyed Benedictine abbey. The last item on the programme was Sudeley Castle, where the members of the Institute were received by the present owner, Col. Dent Brocklehurst and his family. The first building on the site was apparently a Norman castle, but this was replaced by Lord Sudeley, *temp.* Henry VI., by a fortified house, of

which there remain the ruins of the great hall and other fragments. The building was considerably enlarged, *temp.* Edward VI., by Admiral Lord Seymour, whose work forms the present castle. Every facility was afforded of inspecting the many art treasures contained in the house, and, after being hospitably entertained at tea, the party returned by special rail-motor to Worcester.

The meeting which was thus concluded was a most successful one in every way, the number of members' tickets considerably exceeding 100, and the excellent arrangements planned by Mr. Harold Brakspear, the Secretary of the meeting, and Mr. William Pearce, the local secretary, worked without a single hitch from first to last. The weather, moreover, was all that could be desired; not a single excursion being marred by rain. It was decided that next year's meeting should be held at Colchester.

OLD SURREY CHURCHES.

THE first thing that strikes one as a prevailing feature in the village churches—if one excepts a few noteworthy structures such as Ewell, Walton, Headley, Worplesdon, West Molesey, Frensham, Peperharrow, and Puttenham—is the picturesque steeple, in most cases a small turret with spirelet, and both generally covered with "shingles." One or two elegant towers with spires occur, such as Chaldon, Newdigate, Elstead, Abinger, Ash, Byfleet, particular charm attaching to the first-named on account of the compactness of the church and the almost studied harmony of the irregular roofing. Some of the churches are long, and practically all of them are low, without clearstory or triforium. Many show Norman work; even Little Bookham having arches of considerable span from column to column resting on Norman capitals, as if it was the intention of the builders to add aisles when the size of the congregation justified such a step. But in this particular instance, the aisle used to be there, as part of the capitals and columns and arches show on the outside, and Perpendicular windows inserted in the bricking up. The windows of the Surrey churches show a wonderful variety—from the seven lancets at the east end of Ockham Church, near Ripley, to the cathedralesque and superb east window at Oxted, near Limpsfield.

Stoke d'Abernon and Carshalton have both been practically ruined by modern rebuilding, the most serious disfigurement being at Carshalton, from the architectural and picturesque standpoint, the almost Queen Anne Gothic flaring red brick and yellow stone nave and aisles being extravagantly out of proportion to, and keeping with, the old stone chancel.

Of Godalming Church it must be said with regret that the restorations that took part there resulted in the removal of beautiful tracery, in the west front particularly, and the insertion of totally different patterns of a more formal and less free design, and—what is perhaps worse—the alteration of one of the Norman arches supporting the tower into the pointed shape. The east window of Little Bookham is a terrible affair, as are also its north aisle windows.

Of the fine, almost town-like, specimens in the east and south of the county are Oxted, Godstone, and Horley, without excepting even Brockham and Merstham. Of the less well-known churches, but very interesting and charmingly situated, particular attention is called to Merton, originally built by the monks of the abbey near by; Pyrford, near Byfleet and Newark Abbey; Wisley, one mile south of Byfleet Church; Thames Ditton, with its squat tower, mainly of wood, surmounted by a tiny and thin spire—quite a stripling, in fact; Banstead, with interesting interior, and chantry and screen arches, and fine, but modern, decorative mural painting; Leigh; Shere, with three narrow slits in the upper stage of the tower and handsome broach spire; East Clandon, singularly fascinating in *ensemble* from either end, amid charming surroundings; West Horsley, one of the best churches between London and Guildford, and possessing an old wooden west porch; Old Malden, about fifteen minutes' walk from Worcester Park Station—turn up by the Plough Inn; Witley; Compton, with its singular chancel of two different heights, the lower arch being surmounted by a window visible under the chancel arch proper; Sanderstead, near Croydon; Chessington, containing unique timber columns and arches separating nave from south aisle; Esher old church, Mickleham, Buckland, Fetcham, Chipstead, and Limpsfield.

A very few have small transepts, such as Thorpe, Oxted, Chipstead, Ewhurst, Dunsfold, Puttenham, Nutfield, Witley, Ashtead—a very long north one—Godstone, Brockham, Shere, Bletchingley—these two being gableless. Godalming and Leatherhead and Kingston are the town churches with transepts.

Wanborough, between Guildford and Farnham, on the north side of the Hog's Back, has no steeple at all, only a small roof projecting from the west front, and sheltering a diminutive bell. A singular, and not very pleasing, arrangement occurs at Frimley, where a pediment is arranged over the aisle fronts and leaning to against the sides of the west tower of the XVth century, of which period the aisle west windows also are.

Amongst town churches Leatherhead is a majestic example, with its bold tower standing "four square" to the winds. It, too, has transepts, but the church, being rather closely surrounded by houses on one side, and trees in the churchyard on the other, a general view is difficult to obtain that would satisfy the eye of the architect and antiquary. Kingston tower upper stage is of brick—a comparatively modern one, with a poor parapet, though the whole church is of fine proportions and detail. If the brick were replaced by stone, and with a good parapet and corner pinnacle, the church would be rendered worthy to rank with many of the town churches throughout the land. Godalming we have dealt with *ante*.

Farnham has superb windows, especially at the east end, while the interior, with its interesting west end and fine roof, is striking. Nor should the choice St. Mary's Church, Guildford, be omitted from mention, both as regards exterior and interior, which would repay very careful study. The chantry, too, on the south side of that nightmare hard by—the awful St. Nicholas' Church—must not be passed over, as it is of the Perpendicular period.

Louvers occur at Leatherhead—where those on the south side are irregularly placed, the lower one being very large—Compton, Mickleham, Banstead, Esher Old Church, a curious example, Tandridge, with tracery in their gables, West Horsley, and Chessington, to the south side of the nave, hidden from outside view by the south aisle roof.

Several churches of the county have not been alluded to by name in this article, as they have the different features referred to in those above cited.

With so many admirable examples, so to speak, to hand, cannot the county architects be induced to design their modern churches more in harmony with the unpretentious, dignified, quiet, and unassuming religious edifices of a bygone day, which are the pride of the county and the delight of the antiquary?

Few counties can boast of such architectural and picturesque wealth in the matter of village churches as can the county of Surrey, which holds its head very high, and affords a vast amount of profitable and pleasant study for those who love ecclesiastical art for its own sweet sake.

JOHN A. RANDOLPH.

THE ROYAL SANITARY INSTITUTE.—At an examination in Sanitary Science as applied to Buildings and Public Works, held in Norwich on July 27 and 28, three candidates presented themselves. The following two candidates were awarded certificates—Archer, William Henry, (Cromer), Hutley, Edward (Colchester). At an examination for inspectors of Nuisances, held in Norwich on July 27 and 28, thirty-one candidates presented themselves. The following eleven candidates were certified, as regards their sanitary knowledge, competent to discharge the duties of inspector of nuisances under the Public Health Act, 1875—Bannerman, D. B. (Manor Park), Blower, R. T. (Norwich), Canham, G. E. (Norwich), Cobb, W. (Caterham Valley), Cox, C. L. (Gosport), Emett, J. P. (Canonbury), Hodgson, Helen S. C. (Pontefract), Lloyd, W. T. (Weybridge), Meyler, S. J. (South Norwood), Mitchell, Mary C. (Crowthorne), Rouse, F. J. (Chislehurst).

THE INSTITUTE OF SANITARY ENGINEERS:

MEETING IN MANCHESTER.

THE annual summer meeting of the Institute of Sanitary Engineers was held in Manchester on Friday, Saturday, and Sunday, July 6, 7, and 8, Sir William Mather M.Inst.C.E., presiding.

In his address of welcome, Sir William said the Institute of Sanitary Engineers represented a branch of the engineering profession which, taking it all in all, was, he thought, the most beneficial of all the branches of the engineering profession. There were the civil engineer, the hydraulic engineer, the electrical engineer, the mechanical engineer, but the sanitary engineer seemed to differ from all these branches inasmuch as he laboured in a field in which, more or less, all branches were interested, but which had to do almost solely and alone with the well being of the people in the highest sense of the word. To be occupied in projecting and carrying out schemes for the purpose of improving the health, the comfort, and the means of life in large communities was a noble work, entirely apart from the remuneration that it brought. In fact, one might say that the sanitary engineer had to work without many of those incentives and rewards which attached to other branches of the profession. He was occupied in dealing with elements in life which were not generally regarded as delightful to look upon or to contemplate; it was a branch of engineering which did not offer many attractions to those who desired to win praise from their fellow-men or to erect monuments to themselves by the work of their hands.

England, as they knew, enjoyed the reputation—or did enjoy the reputation some years ago—of being the most advanced nation in the world in sanitary science, and in its application. He remembered that some twenty years ago an eminent German scientist, Dr. Virchow, who came to England to report on the general tone of our institutions—sanitary, educational, municipal, and otherwise—reported on his return that England was 100 years behind Germany in education, but 100 years ahead of Germany in sanitation. He thought that figure of speech represented very much the difference between Germany and England. He remembered Berlin when it was a city ugly and offensive in many respects, with no drainage system except that which was exposed to the street, with a vile atmosphere, bad water, and bad lighting. But after twenty years Berlin was now the pride of the German Empire. That great transformation had been brought about because education had advanced and performed its perfect work in relation to applied science, to the advantage of the inhabitants of a great city. The sanitary engineer, the civil and mechanical engineer, and the chemist could provide several essential conditions of life without which our boasted civilisation was all veneer and vanity. Every river and stream in the land might be pure, every town and city clear of smoke and noxious vapours, mills and manufactories wholesome and healthy, and the housing of the people, even the most humble, sanitary and cheerful, with fresh air and open spaces adorned with grass and shrubs, common to all who inhabit the towns, together with good water and efficient drainage. All these science and experience could accomplish. The architect, added to these men of science, would contribute the artistic feature to all necessary structures.

Human communities were structures depending on their foundations, like other physical structures, being well laid and strong. It was a frequent complaint on the part of our municipalities, when they were charged with neglect of the housing problem, that the expenditure of public money in this direction was not encouraged because such a vast number of people did not appreciate better conditions of life; and the greatest impediment in this country to the better housing of the people was not the want of will on the part of our municipalities nor the want of money—it was the difficulty of maintaining the inhabitants of the poorer classes in a fit condition for human comfort owing to the habits and want of cleanliness of the people themselves.

Professor E. G. Coker, M.A., President of

the Institute, proposed a vote of thanks to Sir William Mather, which was seconded by Dr. J. B. Wilkinson, M.O.H. (Oldham), and carried with acclamation.

Strength Properties of Brickwork.

The following paper was then discussed—i.e., "The Strength Properties of Brickwork as Determined by Experiment," by Mr. W. C. Popplewell, M.Sc. The author said :—

The object of this paper is, in the first place, to describe the manner in which experiments on the strength of brickwork are carried out in the materials testing laboratory of the Manchester School of Technology; to indicate the kinds of results which are to be expected from these; and, lastly, to quote several of the more important of the data which have been obtained here and elsewhere.

Testing Machine and Measuring Apparatus.

The machine used for making tests of brickwork and similar materials is a 900-ton hydraulic press, having a 20-in. ram. In this machine the pressure of the water above the ram is shown on a pressure gauge. In order to allow for the effect of the friction of the cup leather, the weight of the ram and its attachments, and the upward pull of the side pistons which are used to lift the ram, a direct calibration has been made by which the load on the specimen can be calculated directly from the pressure, with a very fair degree of accuracy. The formula made use of is W (tons) = (p (lb.)—34) 0·139.

This formula has been obtained by means of a steel spring piece which had first been loaded in the Wicksteed testing machine. In this way the load in tons on the specimen can be obtained directly from the pressure in pounds per square inch.

The compressions corresponding to the loads are obtained by means of a Martens mirror apparatus. In this instrument changes of length of the specimen which is being loaded cause the rotation of a mirror, and the reflection of a graduated scale in this mirror, as seen through a telescope, is caused to appear to move across a fixed line in the diaphragm of the telescope. The difference in the position of this line on the scale is a measure of the change of length between two points a fixed distance apart. In the experiments here referred to two mirrors were used, placed on opposite faces of the pier, so as to indicate any inequality in the stress. The readings were taken on a length of 20 c.m. on the face of the brickwork, and readings could be read directly to 1-10,000th of an inch, and by estimation to 1-50,000th.

Kinds of Tests Carried Out.

The experiments which have been made include tests of piers of brickwork, tests of the bricks of which the piers were built, and tests of the mortar used.

All the piers tested have had a square section, 18 in. by 18 in., giving a sectional area of 2¼ sq. ft. Those tested up to the present have been 36 in. high, but three which have recently been built are 48 in.

The building of the piers has in all cases been carried out by working bricklayers. Some have been built in place on the lower platen of the machine, while others have been built on stiff squares of timber and moved into the machine when ready for testing. In all cases the top and bottom surfaces of the piers have been set either in neat Portland cement or in plaster of Paris, in order to distribute the load uniformly. This is an important point, and seriously affects the results of the experiments.

The various piers tested up to now include the following :—

One of common local wire-cut bricks	with lime mortar.
One of common local wire-cut bricks	with Portland cement mortar.
One of Accrington	with black mortar.
One of blue Staffordshire	with Portland cement mortar.
Six of blue brindle Staffordshire	with 2 black lime mortar.
	with 2 Portland cement mortar
	with 2 lias lime mortar.
Five of Accrington	1 Portland cement 1 to 1.
	1 ,, 2 to 1.
	1 ,, 3 to 1.
	1 ,, 4 to 1.
	1 ,, 5 to 1.

At first no special plan was adopted so as to systematise these tests, but now, for any set of piers built and tested, the idea of obtaining information on specific points is kept in mind. To the above must be added three piers recently built but not yet tested. These are :—One of blue Staffordshire, with Portland cement mortar 1 to 1; one of second Accrington, with Portland cement mortar 1 to 1; one of second Accrington inside, and faced with blue Staffordshire with Portland cement, with mortar 1 to 1. In the case of these last, the height is 4 ft. instead of 3 ft. Thus, in all there are eighteen piers, fifteen of which have been tested.

The result of the first fifteen tests have been already published and discussed in a paper published in the *Proceedings* of the Institution of Civil Engineers, CLXI.

Results Obtained.

Relation of Stress and Strain.—The measurements taken with the Martens apparatus make it possible to express a relation between the stress and mean strain at any period of the loading.

This relation is conveniently expressed by a plotted stress-strain curve, which is similar to the curve obtained on the first loading of any material having the nature of soft stone or mortar or concrete, in which portions of a harder substance are set in a matrix of a different substance, which is generally soft in nature.

This diagram may be divided into three portions :—

(*a*) There is a curved portion with the concave part upwards. This indicates a diminution of strain as the loading progresses, which may be caused by the spaces between the particles which form the substance being closed up.

(*b*) The second part of the diagram is straight, thus pointing to an elastic condition of the substance. This elasticity is not quite perfect, as there is generally found a little permanent set on the removal of the load. It is further found, when the specimen has been loaded and reloaded once or twice, that the permanent set is almost completely eliminated. From the readings taken during this part of the loading it is possible to calculate a value of Young's modulus (E). For the best kinds of brickwork (E) has been found to have an average value of about 125,000 tons per square foot, or 1,940,000 lb. per square inch. This may be taken to mean that for the application of a stress of 1 ton on each square foot a wall or column of brickwork will be shortened 1-125,000th of its height. For example, in the case of brickwork 100 ft. high, loaded 12½ tons in each square foot, there would be a shortening, apart from its own weight, of 1-100th of a foot, or about ⅛ in.

(*c*) At the end of the straight portion the line again becomes curved in the opposite direction from that of the first part. This indicates a growing increase of compression, and marks the end of the elastic condition. If the terminology used in the case of iron and steel be employed here, the point where this last curve begins may very well be called a "limit of proportionality" (P. limit). What is happening in the material after this point is passed is not very clear, but it may be thought probable that the particles, which, up to this point, have retained nearly the same relative positions, are being pushed further out of their places and a sliding movement is beginning to take place. It is very likely that this movement takes place first in the mortar, and when this begins to move and fail, the even distribution of the stress on the bricks themselves must be changed, with the result that these begin to crack, and a general movement begins to take place throughout the brickwork.

Effect of Successive Applications of the Load.—If a loading is carried just beyond where it has been called the proportional limit, the load removed, and then again applied, it is found that the measurements taken during the second loading plot on a straight line up to where the previous loading stopped. It would seem that the effect of the first loading is to press the particles permanently nearer together. The result is very like what is found to take place in similar experiments on some of the metals.

Cracking and Crushing Stresses.—In compressive tests of brickwork it is usual, apart from the elastic measurements, to observe and note the stress at which the first crack is seen or heard, and call this the "cracking stress." The next and the last point reached in the loading is the "crushing stress," which is the maximum stress supported by the brickwork, and at which the material is completely broken up.

That final failure takes place by sliding on planes which are inclined to the axis is shown by the fact that the pier finally breaks up into what are, roughly, two pyramids, just in the same way as is seen in the case of stone, cement, and concrete.

The Effect of Mortar on the Strength of Brickwork.—The five piers whose results will now be given were prepared and tested with the idea of finding out to what extent the strength of the brickwork is dependent upon the strength of the mortar. Five piers were built, one kind of brick being used throughout. These were Accrington (Huncoat plastic), with panels on both faces.

On testing three of these bricks for crushing strength it was found that they crushed an average value of 388 tons per square foot. These bricks were tested whole, and were bedded in plaster of Paris when set on their proper bed. Cement mortar was used throughout, the proportions of sand to cement being different for each of the five piers. These proportions were, respectively, 1 to 1, 2 to 1, 3 to 1, 4 to 1, and 5 to 1. The mixing of the mortar and the building of the piers was carried out, as in the previous tests, by a working bricklayer. The tests were carried out as described above, the Martens mirrors being used, and each column was loaded about seven times. The first loading was taken up to 16½ tons per square foot, and each successive loading was about 13½ tons per square foot higher, elastic readings being taken throughout. It is worth noticing that in spite of the great care taken to distribute the stress uniformly on the top faces of the piers, the observations showed there was always a greater intensity of stress on one face than on the one opposite; this excess was found to vary from 10 to 34 per cent. The chief results are given in the following table :—

TABLE I.—RESULTS OF TESTS OF FIVE BRICKWORK PIERS, 1½ FT. SQUARE AND 3 FT. HIGH. MADE OF ACCRINGTON BRICKS AND PORTLAND CEMENT MORTAR. TESTED ABOUT SIX WEEKS AFTER BUILDING.

Mortar used: Sand. / Cement.	Prop. limit last time of loading.	First crack.	Crushing.	Ratio—Strength of brick. / Strength of brickwork.	Strength of mortar.	
					At seven weeks.	At twenty weeks.
	Tons per square foot.				Tons per square foot.	
1—1	85	97	125	3·1	79	98
2—1	80	91	159	2·4	32	51
3—1	78	79	125	3·1	27	28
4—1	72	90	114	3·3	20	24
5—1	72	69	125	3·1	16	18

The mortar was tested in the form of cubes of 4-in. side.

An inspection of these results shows the crushing strength of the mortar to diminish as the proportion of sand increases; also, the strength increased with age. These results are both what one would expect them to be. It will be noticed that only the crushing strength of the mortar is given, as it is found that in tests of this kind the cube collapses very soon after the first crack is seen.

In the case of the brickwork itself, the data obtained are, first, the proportional limit as found from the last set of readings taken in the case of each pier. These agree fairly well with the order of merit of the mortars, though there is far less difference than in the case of the mortars themselves.

In the next column are the stresses at which the first crack was detected. The author thinks this the most reliable criterion of the strength of brickwork, because it marks the point where the stress is beginning to cause internal movement of the material. The same order is maintained, though an exception is to be seen in he case of the 4 to 1 pier. This is probably due to a want of alertness on the part of the observer, whose duty it was to look out for the first crack. The "crushing stresses" in the third column do not appear to follow any particular kind of order, except that the aggregate of the first two is greater than that of the last two. This crushing or collapsing load is always found to be uncertain, and where several piers which are supposed to be precisely similar are tested there may be found to be considerable difference in the final loads, although the cracking points are near together.

It may be well here to quote some of the results of previous experiments in the testing laboratory of the Manchester School of Technology, and already published. These piers were all 1½ ft. by 1½ ft. by 3 ft. high. The stresses are given in the same units as in the last table.

TABLE II.

Brick.	Mortar.	Age. Weeks.	Cracking.	Crushing.	Ratio—Brick. / Brickwork.	Mortar Crushing.
Common wire-cut	Sand and lime	4	35	53	5—1	—
Common wire-cut	3–1 Port'and cement	39	64	84	3·1—1	—
Accrington	Black lime	4	78	96	2·6—1	—
Blue Staffordshire	3—1 Portland cement	39	69	98	3·6—1	—
Brindle	Black lime	12	100	165	2·9—1	31·8
Brindle	Black lime	26	110	185	2·6—1	31·8
Brindle	3—1 Portland cement	12	132	169	2·9—1	10·0
Brindle	3—1 Portland cement	26	90	161	3—1	10 0
Brindle	Less lime	12	38	119	4·0—1	Very poor
Brindle	Less lime	26	41	102	4·7—1	Soft and crumbly

To these may be added a few results recently selected from those published by the Royal Institute of British Architects :—

TABLE III. — STRENGTH OF BRICKWORK. R.I.B.A. EXPERIMENTS.

Brick.	Mortar.	Workmanship.	Crushing strength. Tons per sq. ft.
Blue Staffordshire	Lime	Average	74
" "	"	Good	114
" "	Portland cement	Average	77½
" "	" "	Good	119

In the second table it will be seen that there is a set of piers of Staffordshire blue brindled bricks, which were made in pairs, having different mortars. The second of each pair was twice as old as the first. If the cracking stress be taken as the criterion of strength, it will be seen that there is not a very great deal of difference between the strength of the lime mortar piers and the cement mortar piers, except that the cement mortar fell away in strength, while the lime mortar improved with age. Whether this increase of strength would have been maintained if the second piers had been kept longer it is impossible to say.

The difference between the first four and the last two is, however, very marked. This last pier, built with lias-lime mortar, was evidently very bad. It is probable that the mortar was used too long after mixing, when it had become partially set. There was no hardening of this mortar, which could be easily crushed between the fingers, and the effect is seen in the strength of the brickwork which is lamentably weak as compared with the first four piers of this set. This may be taken as one example of the influence of the mortar on the strength of the brickwork. The other may be taken from the results of the series given on Table I., already referred to. The five mortars used in this set have a gradually increasing ratio of sand to cement, and the results of the tests of the mortars show a corresponding decrease of strength with the increased amount of sand. The brickwork strengths also show a decrease, but not so marked. The strength of the mortar cubes are approximately in the order: 500, 200, 160, 120, 100, while the brickwork strengths are as 140, 139, 110, —, 100.

It is quite possible that if the mortar had been tested in thin flat slabs instead of cubes the results would more nearly accord with the brickwork.

Working Loads on Brickwork.

There is not a great deal of information published regarding the safe loads that can be applied to brickwork, but from what can be ascertained, the following loads, expressed in tons on the square foot, are often used.

Brick.	Mortar.	Workmanship.	Safe stress. Tons per square foot.
Ordinary	Lime	Average	5
Best red	"	Good	8
"	Cement (2—1)	Best	10

A case is quoted of a chimney in Glasgow, where the stress is 9 tons per square foot in still weather, and as much as 15 on the lee side in a gale of wind. In the light of the results quoted here it would appear that the loads usually applied to brickwork are amply safe in most cases. In forming an estimate of the probable strength of any particular kind of brickwork, it is not sufficient to be guided by the names of the materials alone, but to have an intimate knowledge of their quality and the manner in which they are used.

The experiments in the Municipal School of Technology, of which the results have been quoted, were made in connexion with the teaching work of the school and the greater number of the observations taken by the students. It would have been impossible to carry out these somewhat costly experiments if it had not been for the apparatus and material provided by the Education Committee of the Corporation of Manchester, to whom the author wishes to take this opportunity of acknowledging his indebtedness and offering his sincere thanks.

Mr. F. W. Mason (Fellow) then read a paper on "Refuse Destructors."

Mr. J. Ashton, F.C.S. (Fellow), also contributed a paper, on "Sewage Purification Works, and the Health of the Community."

Fire Requirements of the London County Council.

"The Fire Requirements of the London County Council, with Some Notes on Fire-resisting Construction" was the title of a paper by Mr. Percival M. Fraser (Fellow). Towards the end of his paper he said :

My experience of the London County Council is that they do not consider each case on a distinct basis, but attempt to apply stereotyped requirements without sufficient regard to the effect it will have on the business carried on in the building. Thus the provision of a new staircase is repeatedly insisted upon, regardless of the fact that it may open up communication between workpeople of different sexes; again, in the case of patent and secret manufactures, facilities are afforded to undesirable persons to gain access.

External iron staircases are a continual source of thefts and other annoyances. Exit doors next the street must be set back in lobbies in order that the doors may clear the pavement. These recesses are put to improper uses in poor neighbourhoods, such as factories and common lodging houses generally occupy. The facilities for roof escape and the increased number of exits in the latter class of buildings necessitate the employment of a large staff for supervision, and cause serious trouble to the police, as they form a ready means of escape for the large number of criminals who use these premises.

There are many appeals against what the building owners consider unreasonable requirements, but the Council's requirements have generally been upheld by the legal decisions.

The main principles employed by the Council in formulating requirements appear to be as follows :—

1. Separate and distinct means of escape from every room, with direct access to the open air, should be provided. This can be effected in several ways, such as by two staircases or by a staircase and access to the roof, or access to adjoining buildings by means of doorways, balconies, bridges, etc. The alternative means of escape should be as far apart as possible.
2. The buildings should be divided up, both vertically and horizontally, into as many fire risks as possible, by means of walls, partitions, and floors, with self-closing doors, etc.
3. Well-holes acting as flues must be inclosed.
4. All means of escape must be protected with materials sufficiently fire-resisting to withstand fire for thirty minutes.
5. Means of escape must be of ample dimensions, and otherwise constructed to avoid accidents in time of panic, even though from a false alarm.
6. Endeavour should be made to keep back smoke as well as flame.
7. The most direct routes should be taken to the open air.
8. All "dead ends" should be avoided.

The following schedule of fire-resisting materials is set forth in the London Building Act :—

Good stock bricks.
Granite or stone.
Iron, steel, or copper.
Slates and tiles.
Terra-cotta.
Flagstones under certain conditions.
Concrete formed of cement or lime and broken bricks, tiles, stone, ballast, pumice-stone, coke breeze.
Reinforced concrete.
For doors and similar fittings, oak, teak, jarrah, or other hard woods, 1¾ in. full, in solid bedded frames. The same for stairs, internal and external, with plaster soffits.
Beams and posts of hard woods with 1 in. of plaster, on metal lathing, or, when in combination with iron, 2 in. of plaster.
For floors, concrete and iron 5 in. thick.
For ceilings of projecting shops, 5 in. of concrete pugging.
Inclosures and partitions of 3 in. incombustible material.
Glazing in wire-wove glass ¼ in. in thickness, or electro-glazed glass in squares of 20 in.

It should be noticed that the provision of stone steps and iron doors is often required by the Council. Both of these are quickly destroyed by the action of fire and water, and should be eliminated from the Act.

Fire-Resisting Construction.

The common expression "fireproof" is hardly a correct term, as no building materials are proof against fire, and are still less so when built into a structure, by reason of the joints and the different expansions of various materials under heat, when used in combination.

A material which will stand a great heat may immediately be destroyed when drenched suddenly with water, such as will certainly happen in any ordinary conflagration. A material cannot therefore be considered of value as a fire resistant until it has—to use an old expression—passed through fire and water.

The following *précis* of the effects of the great Cripplegate Fire in London in 1897 is instructive :—Ordinary stock bricks almost uninjured, perforated bricks broken to pieces, stone destroyed, iron girders twisted and curled up, wooden beams charred, but otherwise practically uninjured, match-boarding burnt to tinder. Allowance for expansion must be considered. Concrete and iron expand in the same ratio, but terra-cotta and iron do not.

It is well to remember that although the first cost of fire-resisting construction is large, the insurance rates and rent roll are both favourably affected thereby. Architects should not take upon themselves the responsibility of specifying a material which has not been tested.

Elaborate tests have been carried out by

the British Fire Prevention Committee with all the ordinary forms of construction and most of the well-known patents. They divide the test into three classes:—(1) Temporary protection, which implies resistance to fire for three-quarters of an hour; (2) partial protection for one and a half hours; (3) full protection two and a half hours.

Materials with Regard to their Fire-Resisting Qualities.

Well-burnt clay bricks are the most reliable building material. Lime mortar is to be preferred to cement. Fireclay is, of course, best, but is not so strong.

Terra-cotta in its porous form is highly satisfactory. There are several other descriptions of terra-cotta which are all more or less useless as a fire-resisting material.

Plaster made with plaster of Paris is a tolerable heat resistant, as it stands drenching at a white heat; it is improved by the addition of asbestos or pumice-stone.

Concrete in slabs of which the aggregate is pumice-stone is classed with the "full resistance" materials. Reinforced concrete is an excellent fire resister, providing the reinforcement is 2 in. from the surface.

The following compositions of concrete are given as being highly serviceable. The effects of severe tests with fire and water are also briefly given. The following proportions are mixed with one part of ferrocrete cement, the sand being sharp pit sand:—

1. Slag 3, sand 2.—Slight cracks and deflection.
2. Broken granite 3, sand 2.—Ditto.
3. Broken granite 3, sand 2.—Ditto, and washed off slightly.
4. Burnt ballast 5.—Washed off badly.
5. Coke breeze 5.—Washed off slightly.
6. Furnace clinkers 3, sand 2.—Slight cracks and deflection.
7. River ballast 3, sand 2.—This is wholly bad.

Sandstones are better than limestones and granites, but all are unreliable. Iron and steel unprotected are unfit for use for constructional purposes. Iron expands about 1½ in. in 10 ft. under prolonged heat. Silicate cotton, slag wool, or asbestos are useful materials, as they are quite incombustible, and may be procured in slabs and sheets, or in the form of cloth. Timber in baulk is perhaps as good a fire resister as can be obtained, as after it is once charred it burns very slowly, and retains its strength when suddenly drenched. Its life is greatly increased by being coated with plaster or tin. The so-called fireproof paints are of very little practical value. The possibility of ignition of timber may be decreased by the use of tungstate of soda, silicate of soda and limewash, and asbestos paint. These, however, merely resist ignition, and cannot be considered to resist fire. Treated woods become hydroscopic and brittle, they also discolour and are hard to work.

Floors are of many descriptions. Arched floors are strong, but heavy and expensive. Various forms of hollow tubes and slabs of terra-cotta and asbestos, etc. These are all cheap, light, and serviceable. Concrete reinforced steel rods makes an excellent floor.

Pavings may be of cement, asphalt, metallic paving, wood blocks, and wood boards laid directly on to the concrete; these should be tarred on the underside.

Cork carpet on concrete makes a very good floor.

A tongued wood floor of ordinary construction with plastered ceiling will stand an ordinary conflagration for about an hour.

Flats are constructed similarly to floors, but are lighter and are best asphalted; vulcanite and wood cement are also largely used.

Partitions.

Ordinary lath-and-plaster partitions, when the intervening spaces are filled in with slag wool, are rendered fire-resisting and sound-proof.

Other light partitions are formed in concrete, brick on edge, terra-cotta, asbestos, and other slabs, uralite, expanded metal and plaster, or fine coke-breeze concrete, all of which may be fixed on a steel or wood framework.

An air space in the thickness of a partition is a great advantage.

Continuous sheets of metal when used for reinforcement are bad, as they tend to buckle under heat.

Staircases.

Balk timber is the best material for steps. Other steps are constructed of reinforced or ordinary concrete, stone, and built-up hardwood.

Doors.

Iron doors, as stated before, are required by the Council, but unless secured all round the edges are practically useless. Sliding doors are best, as they can be held on at least three sides.

Armoured sliding doors are perhaps the best for use in party walls between large buildings. These are made up with wood and uralite, or sheet tin, and can be arranged by means of inclined runners so that when a certain temperature is reached the door fastenings give way and the door is allowed to close automatically by gravitation. The author had used this description of door as made by Messrs. Mather & Platt, and always found them to be serviceable for general use.

Glazing.

This has already been described under "Factory Buildings." Opinions differ as to whether roof glazing over staircases, well-holes, etc., should be fire-resisting, or whether it should be constructed so as to break in case of fire and carry away smoke and flames. This is a bad principle, as every time a staircase door is opened huge volumes of smoke are drawn in and thus render the staircase impassable. The use of shutters is not advisable.

Miscellaneous.

Simple precautions against the spread of fire should be employed in every class of building, such as floor pugging and treating woodwork with solutions, and the use of steel roofs and concrete stairs with wood casing.

Automatic sprinklers, which act at a temperature of 150 deg. to 200 deg., are useful for checking a fire in its infancy, but are open to objection. Automatic fire alarms are useful, but require constant attention.

A note on housing of the working classes was contributed by Mr. A. Alban H. Scott (Fellow).

In the afternoon the members visited the works of Messrs. Mather & Platt.

From the Salford Ironworks the party proceeded by special cars to the Salford Sewage Works, where they were received by the Mayor (Mr. Alderman Frankenburg). The engineer (Mr. J. Corbett) conducted the members, and explained the treatment, which is by chemical precipitation and bacteria beds.

Dinner.

In the evening the members were the guests at dinner at the Midland Hotel of Sir William Mather, who presided. The company included the Lord Mayor of Manchester (Mr. J. H. Thewlis), the Mayor of Salford (Mr. Alderman Frankenburg), the President of the Institute (Professor Coker), Professor Delepine, Principal Reynolds (Manchester School of Technology), Principal Knowles (Salford Technological School), Dr. Niven (Medical Officer of Health), Dr. Carter Bell, Mr. Councillor Huddart, Dr. E. Hopkinson, Mr. A. Willett, Dr. A. Schwartz (School of Technology), Mr F. Scott, Mr. Alderman Wilson, Dr. Skinner, Dr. Wilkinson (Oldham), Mr. G. W. Chilvers (Chairman of Council), Mr. N. W. Hoskins (Hon. Secretary), and others.

In responding to the toast of the Lord Mayor and Corporation of Manchester and the Mayor and Corporation of Salford, Mr. Alderman Frankenburg (Mayor of Salford) said the death-rate of Salford had been reduced from 27 to 17 per thousand—a saving of something like 2,300 lives per year. The death-rate of Salford was less than that of Brighton. The Corporation intended to make Salford a health resort, and he asked their friends present from the South of England instead of going to Brighton to come to Salford.

The Lord Mayor of Manchester, who proposed "The Institute of Sanitary Engineers," spoke of the important work which the sanitary engineer performed in relation to the health and well-being of the community. The toast was responded to by Mr. G. W. Chilvers, who briefly referred to the recent progress of the Institute in connexion with its students' classes and examinations, which tend to advance the status of the sanitary engineer.

Professor E. G. Coker proposed the health of Sir William Mather, who, in responding, expressed "amiable indignation" at this innovation in the programme, and wished the Institute every success.

The toast of the "Victoria University" was afterwards proposed to by Professor Coker, and responded to by Professor A. Sheridan Delepine. Mr. N. W. Hoskins proposed the "Manchester and Salford Institutes of Technology," and complimented Manchester on having such a well-equipped school for the training of the sanitary engineer. The toast was responded to by Principal Reynolds, Manchester, and Principal Knowles, Salford.

Mr. T. B. Simmons, Vice-Chairman of Council, proposed the toast "The Invited Guests: The Sanitary Committees, Engineers, and Medical Officers of Health for Manchester and Salford," and Dr. James Niven, Medical Officer of Health for Manchester, and Mr. Councillor Huddart, Chairman of the Salford Health Committee, responded.

On Saturday the members were shown through the Manchester School of Technology by Mr. J. H. Reynolds, director of higher education; later, they visited the University by invitation of the Vice-Chancellor, and Professor Delepine made arrangements for an inspection of the bacteriological laboratories. In the afternoon a journey to the Delamere Sanatorium was undertaken, under the guidance of Dr. Wilkinson.

On Sunday the members attended morning service at Manchester Cathedral, and in the afternoon they drove to Barton Bridge to inspect the aqueduct.

CARVED BENCH ENDS:

East Budleigh Church, Devon.

Ornamental bench ends, either in the form of carved panels or terminating with finials of poppy heads, are very characteristic of churches in the West of England, and particularly numerous in Devon. It is difficult to ascertain when this custom was first introduced, but it is likely to have been partially used at an early period, although the greater number of specimens that exist are of the Perpendicular style. East Budleigh possesses some sixty or seventy examples, all highly ornate, boldly carved, and showing very clearly that the old craftsmen had great inventing capacities combined with high technical ability. The wood used is oak, and although some panels exhibit less skill in treatment than others, they all breathe of that vivacious delight in the work itself, so universal before the days of machinery. The pews at East Budleigh exhibit the arms of local families, and among them those of Sir Walter Raleigh and his father, who were intimately associated with the place, the former being born at Hays Barton, some few miles away. It has been suggested that much of this and other carving in Devon was done by sailors who sailed under Raleigh, Grenville, Drake, etc., who, on their safe return from the long voyages, erected these humble offerings to the House of God. A detailed study of the subjects depicted tends to confirm this view, for we find such objects as ships, dragons, fish, seaweed, and plants of tropical growth, carved with such faithfulness that the originals must, one would think, have been familiar to the carvers. Be this as it may, the old carved bench ends in our village churches give a delightful decorative aspect to the buildings in which they are placed, as well as forming most interesting and valuable links with the past, and often the only remaining memorials of men whose deeds have gone to the making of empire, but who are now forgotten and unknown.

Masonic Temple, Linlithgow.—The memorial-stone of a new Masonic temple being erected by the members of the Honourable Lodge of Linlithgow, Ancient Brazen (No. 17), was laid a short time ago. Mr. W. M. Scott is the architect of the work, which is expected to cost about 1,000*l*.

Proposed Enlargement of the Edinburgh Court of Session.—Plans are being prepared by the Board of Works for the proposed enlargement of the Outer House, or Court of Session. The general scheme of enlargement embraces, it is understood, the setting back of the building southwards, on the open space next the Cowgate, and the enlargement of the five courts of the Outer House, the provision of waiting and retiring rooms for witnesses, rooms for officials, and better accommodation for restaurant purposes. These plans are purely tentative, and the adoption of them or others will depend on the attitude of the representatives of the Government towards them.

Ralegh Pew (Arms Defaced).

Arms of St. Clere.

Arms of Ralegh.

Carved Bench Ends, East Budleigh Church, Devon. Drawn by Mr. Sidney Heath.

Illustrations.

COLLEGES, CAMBRIDGE.

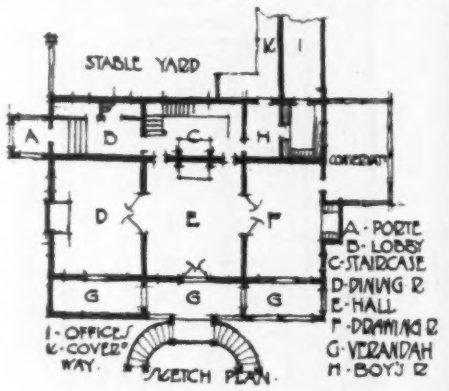
THESE illustrations are from old prints published in Loggan's "Cantabrigia Illustrata," and they are referred to in our leading article this week.

MANSION FLATS, 25 & 26, BERKELEY-SQUARE, W.

THE accompanying illustration shows a detailed elevation of this building, which has been designed to create the impression of a large town-house. These flats are nearing completion, and with the block at 12, Hyde Park-place, by the same architect, form an important addition to the rebuilding of this part of London, as an endeavour has been made in the direction of a distinct advance on the usual architectural treatment employed for London flats and houses. The front elevation is five stories high, and is composed of a main projecting centre flanked by two short wings; the windows on the front portion are grouped into three bays, connected at the top story by a continuous railing. The whole building is surmounted by a rich console cornice and balustrade. The materials employed for the elevations are brown Portland stone with wrought-iron railings. The contractors are Messrs. Mark Patrick & Son, and the work has been carried out from the designs and under the superintendence of Mr. Frank T. Verity.

HOUSE IN CHINA.

THE house which is to be erected on the outskirts of Shanghai for Mr. L. Dabelstein is built of local bricks and Shanghai stone. The roof is constructed of Oregon pine, and covered with a green glazed patent locked tile, made by a German firm at Tsingtan. These tiles stand the severe rain remarkably well, and give at the same time a pleasing splash of colour to the building quite in tone with its setting. They are worth about 10*l.* per thousand at the works. The internal joinery and panelling to the main rooms is in teak, that of the staircase and hall being elaborately carved by native craftsmen. The floors are in Japan oak and Singapore red wood, with tiles to the offices.



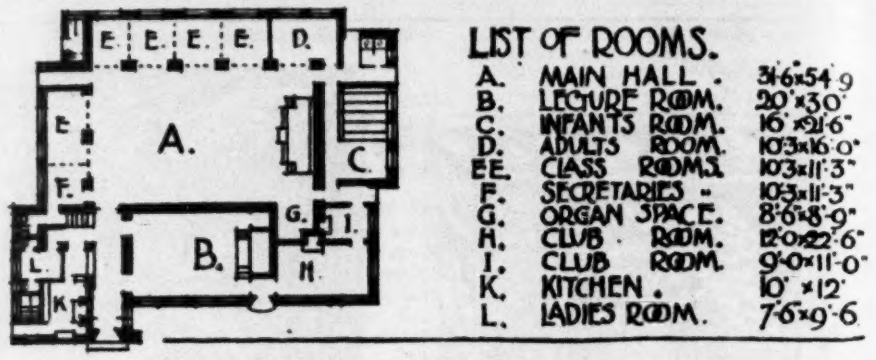
House, China. Plan.

A great problem in designing for Shanghai is to keep the house cool in summer and dry in winter. The best way to meet the difficulty appears to be to provide inclosed verandas, with casements to the "weather" sides, and keep those open which are on the more sheltered elevations.

There are extensive stables to the rear of the building, where the servants' quarters, stores, etc., are placed. Each bedroom is provided with its own bath and dressing rooms. Wong-Fah-Kee, of Shanghai, is the contractor, and the architects are Messrs. Smedley, Denham, and Rose.

NEW WESLEYAN HALL, SEVENOAKS.

THE building illustrated is in course of erection at Sevenoaks, Kent, and is intended for institutional, Sunday-school, and other purposes in connexion with the Wesleyan Church. The walls externally are built of Kentish rag stone, with tracery and window dressings in Monks Park. The roof is slated. Internally, the main hall has an open timber roof, stained of a dark, old oak tint. Sliding divisions are placed between all classrooms, affording the opportunity of opening up the whole hall. The windows are glazed with lead light glazing.



Wesleyan Hall, Sevenoaks. Plan.

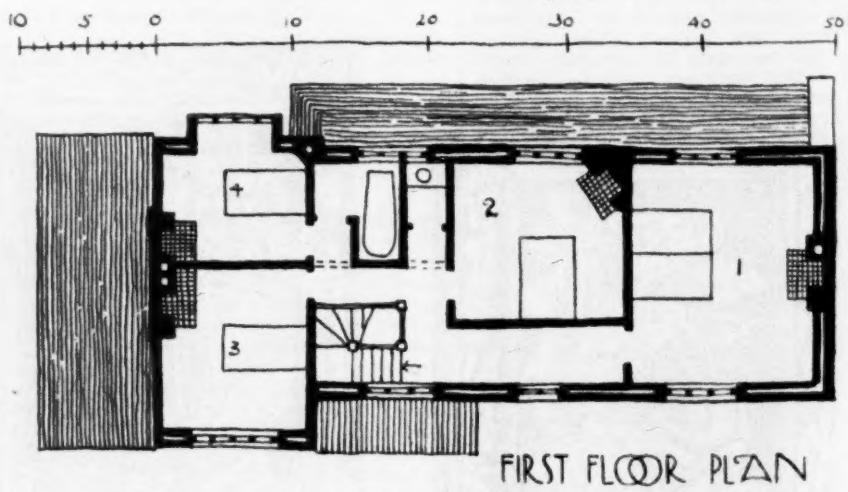
The accommodation includes large central hall, with numerous classrooms, guildhall, two social club-rooms, caretaker's residence, etc.

The heating and ventilation will be upon the low-pressure system. The cost of the buildings is about 5,600*l.* The builders are Messrs. Wiltshire & Son, of Sevenoaks, and the architects Messrs. Potter & Harvey, of London and Sevenoaks.

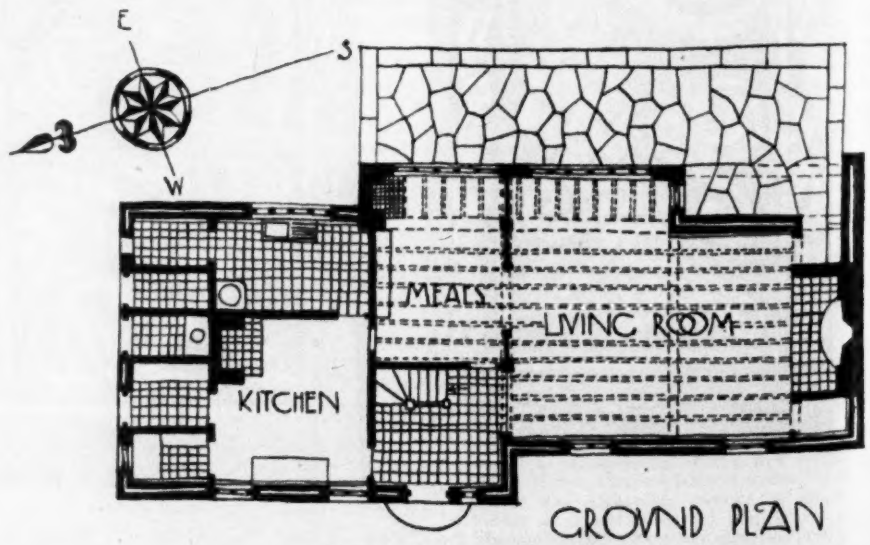
COUNTRY COTTAGE.

THIS little house is to be built with a rough stone base, and from thence upward with brick hollow walls rough cast on the outside. the set-off at sill level forming a shelf all round the house. Up to this point the walls will be finished with a simple oak dado, and the screen partition and folding-doors are also in oak. The first floor is of 4-in. cement concrete, supported on the visible small joists whitened underneath, and the floors laid with Euboeolith, the idea being to avoid as far as possible all hollow spaces for dust or vermin. The walls will be plastered and white limed, and the doors are oak ledged doors, thus obviating the necessity for periodical painting and paperhanging. The roof will be covered with hand-made tiles, and the windows are in oak with lead latticed panes and iron casements. The estimated cost is 750*l.*

DWELLINGS FOR THE POOR, NEWCASTLE.—A meeting of the sub-committee of the Housing of the Poor Committee of Newcastle Corporation was held on the 30th ult., under the presidency of Ald. Newton. A report was drawn up for presentation to a full meeting of the Committee, recommending the City Council to erect seventy-three one-room tenements, with complete equipments, on a site adjoining South Byker playground. The dwellings will be erected especially for the accommodation of aged people, married couples without families, and single women.



Country Cottage: Plan.



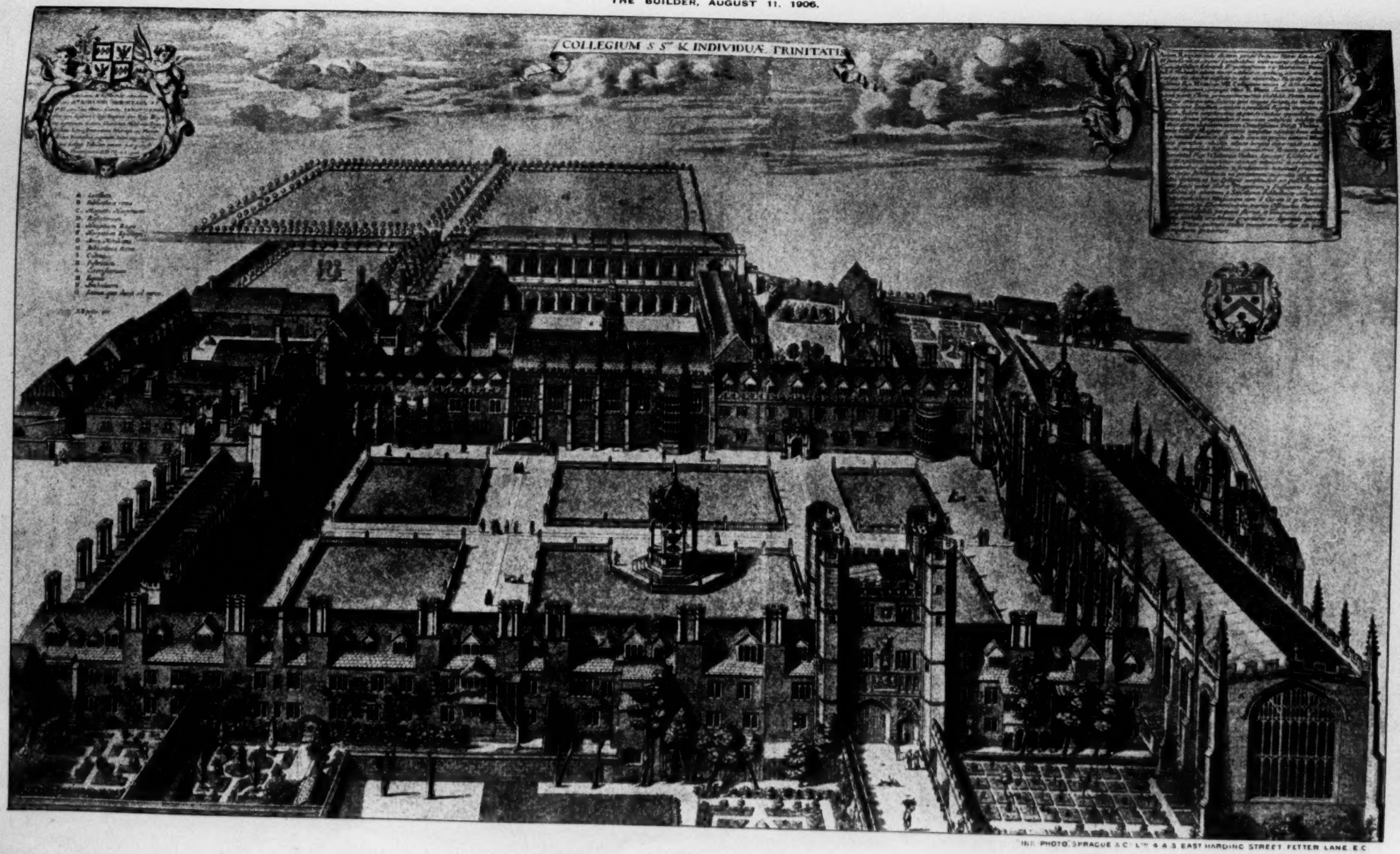
Country Cottage: Plan.

INK PHOTO SPRAGUE & C° LT° 4 & 5 EAST HARDING STREET FETTER LANE E.C.

GONVILLE AND CAIUS COLLEGE.—(From LOGGAN'S "CANTABRIGIA ILLUSTRATA.")

GONVILLE AND CAIUS COLLEGE.—(From LOGGAN'S "CANTABRIGIA ILLUSTRATA.")

INK PHOTO SPRAGUE & C° LTD 4 & 5 EAST HARDING STREET FETTER LANE E.C.



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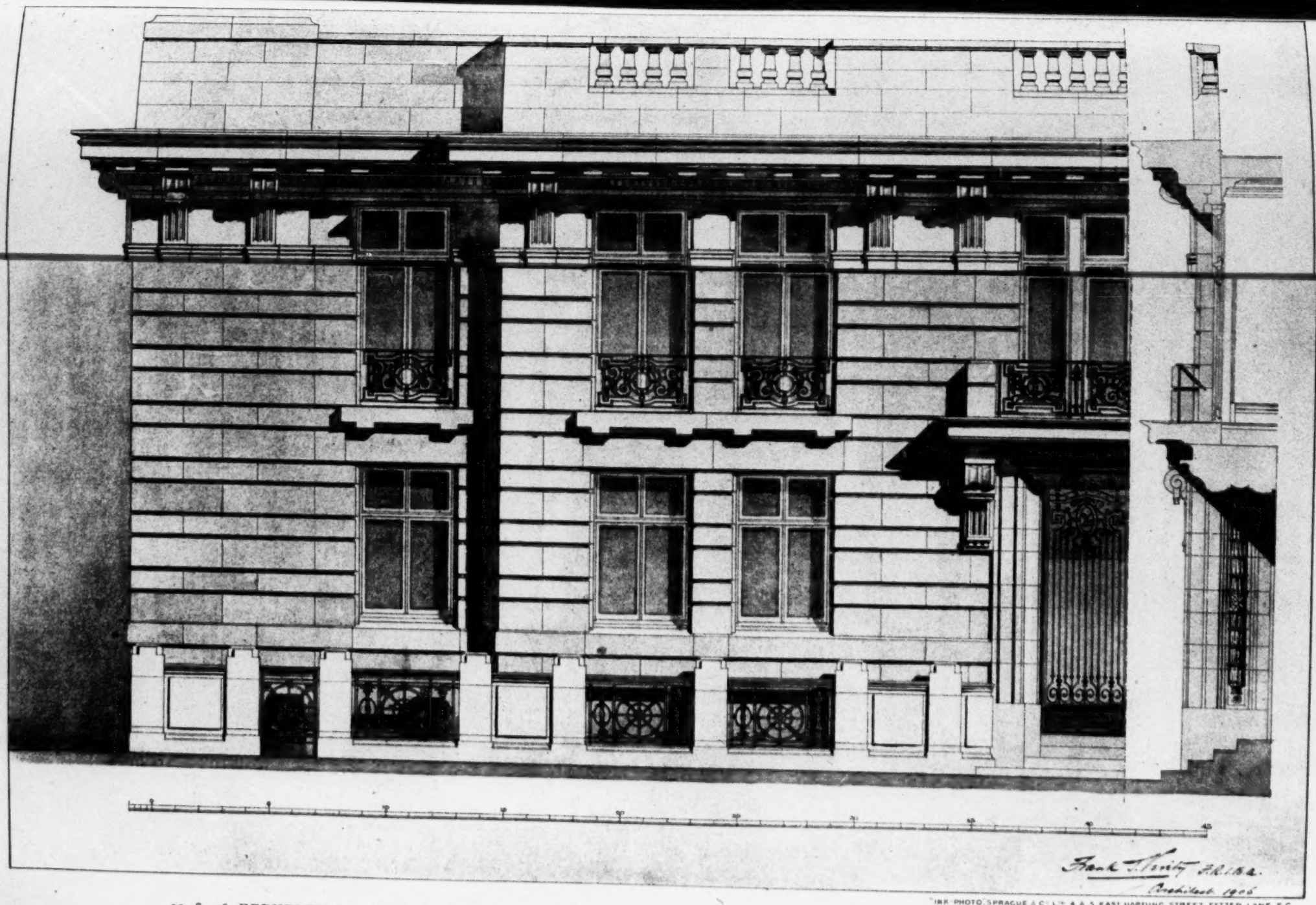
TRINITY COLLEGE.—(From LOGGAN'S "CANTABRIGIA ILLUSTRATA.")



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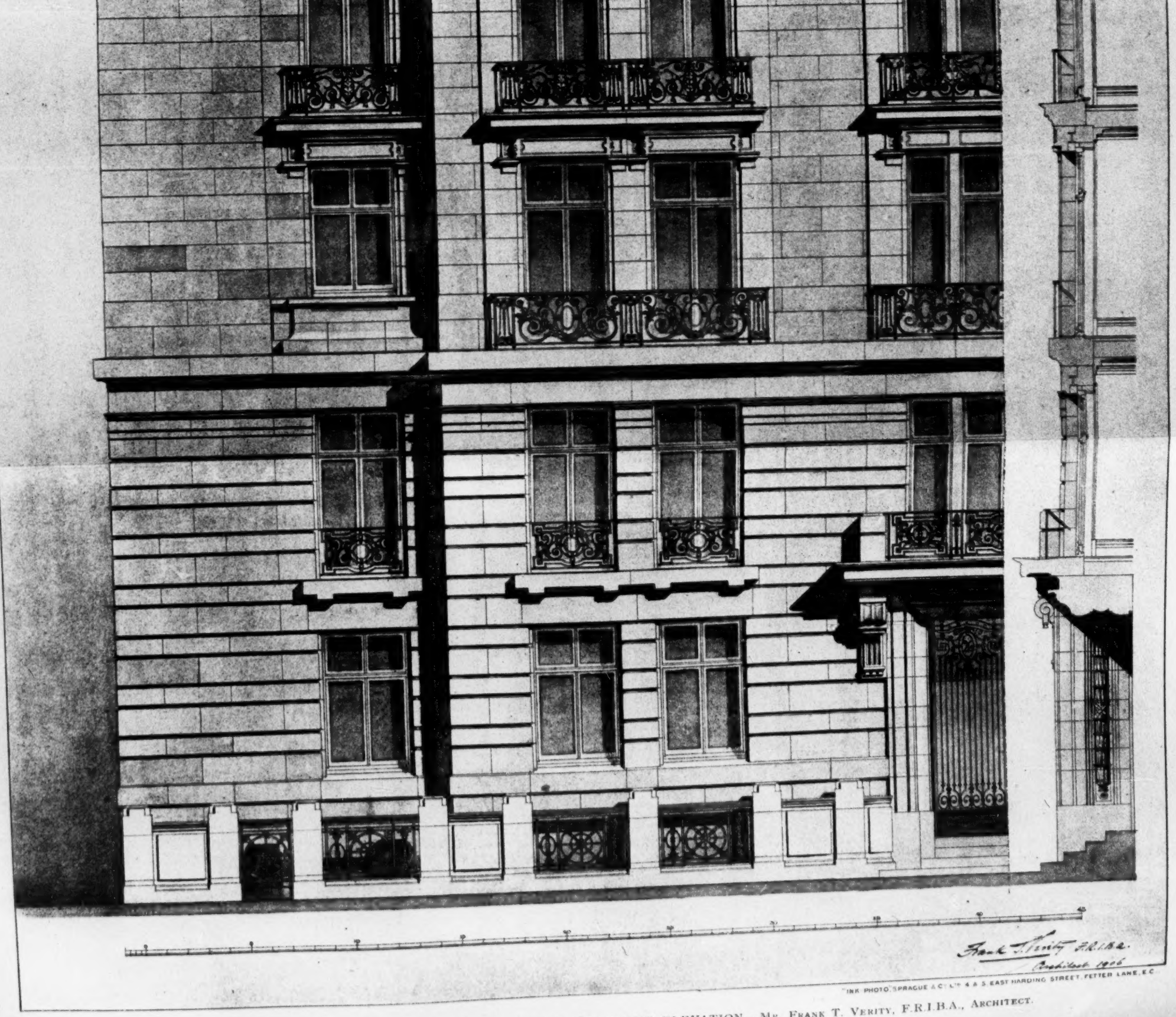
25 & 26 BERKELEY SQUARE MANSION FLATS: DETAIL OF FRONT ELEVATION.—Mr. Frank T. Verity, F.R.I.B.A., Architect.



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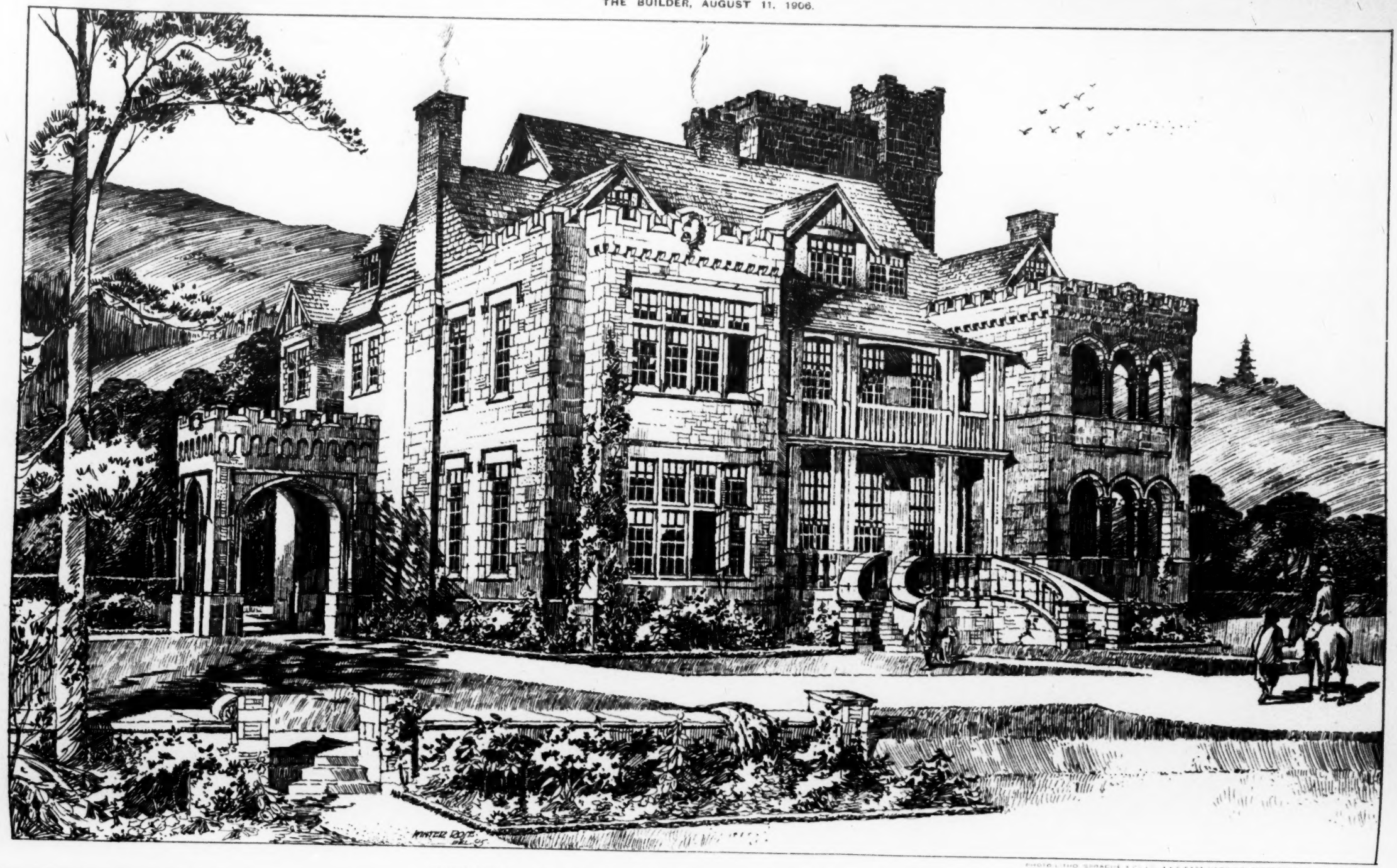

NEW VILLA IN CHINA.—Messrs. Smedley, Denham & Rose, Architects.

NEW VILLA IN CHINA.—MESSRS. SMEDLEY, DENHAM & ROSE, ARCHITECTS.

PHOTO-LITHO SPRAGUE & C° LTD 455 EAST HARDING STREET FETTER LANE E.C.

WESLEYAN-SUNDAY-SCHOOLS

SEVENOAKS. KENT. 1905.

Peter J. Harvey
architect
B.A. Hons Lond
Bedford Row W.C.
Sevenoaks Kent 1905

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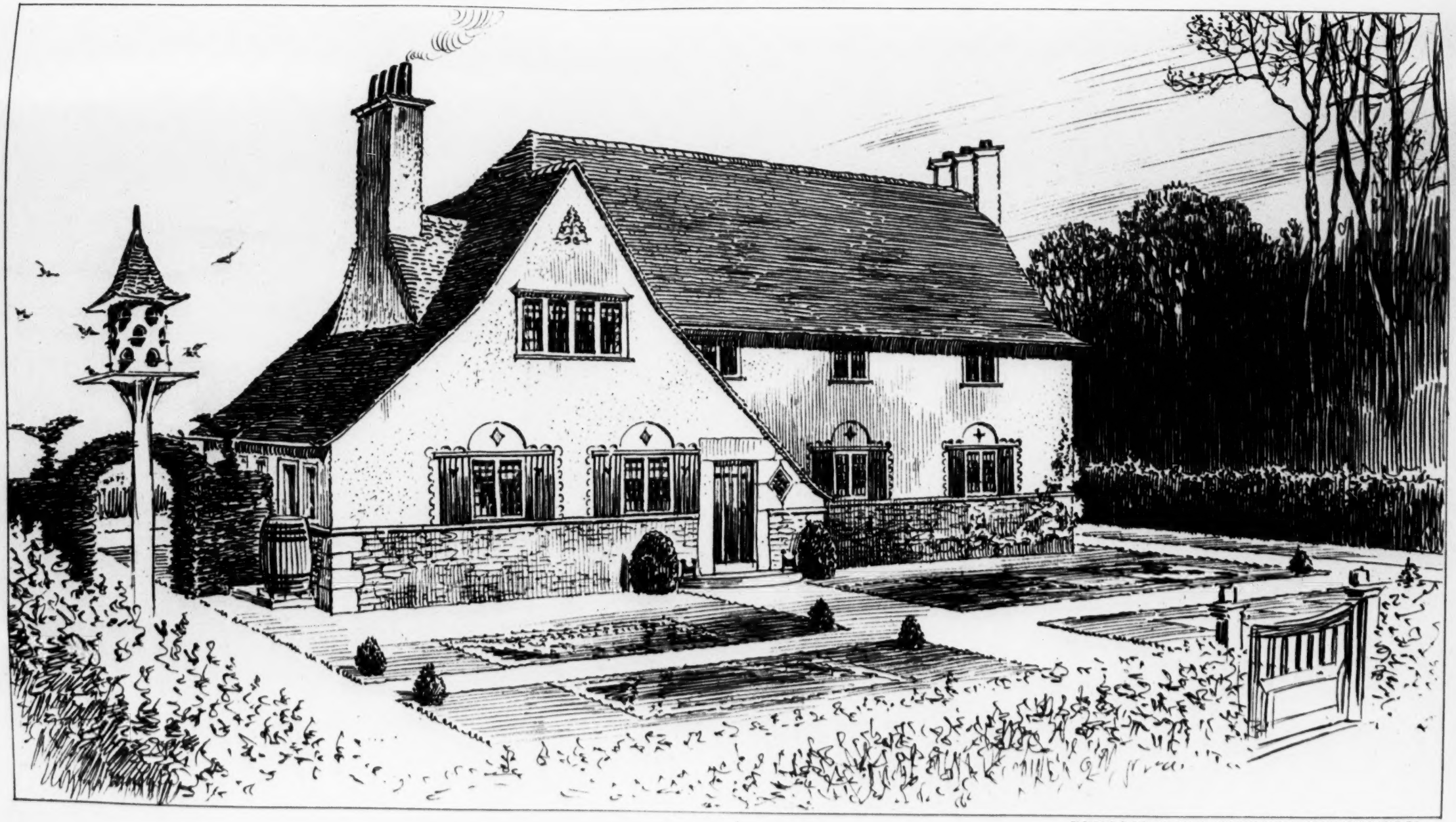
OWN COUNTRY COTTAGE. GARDEN FRONT. MR. H. DARE BRYAN, F.R.I.B.A., ARCHITECT.



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OWN COUNTRY COTTAGE: FRONT TO HIGHWAY.—Mr. H. Dare Bryan, F.R.I.B.A., Architect.

MASTER BUILDERS' CONFERENCE IN DUBLIN:

THE BANQUET.

ON Wednesday evening last week a banquet was given in the Gresham Hotel, Dublin, by the Dublin Master Builders' Association to the President, Council, and members of the National Federation. There was a very large attendance. In the unavoidable absence, through illness, of the President (Mr. Jas. Beckett), the chair was taken by Mr. R. Denne Bolton (Vice-President). On his right sat Mr. G. McFarlane (President of the National Federation), and on his left the Lord Mayor of Dublin. The company included Sir Antony MacDonnell (Under-Secretary for Ireland), Sir Horace Plunkett (Vice-President of the Department of Agriculture and Technical Instruction), the Hon. the Recorder of Dublin, Sir Chas. Cameron, Sir Maurice Dockrell, Sir Thos. Drew, Sir Wm. Smyly, Messrs. M. Goodbody, W. A. Linton, R. Bullen, Alderman Jessop, J.P., J. L. Doves, C. H. Barnsley, James Kiennan, Alderman Bowers, J.P., W. Nicholson, W. Shepherd, W. Mitchell, Joseph Bell, J.P., H. McLaughlin, P. Knox, W. Sapcote, Spencer Henty, C.E., P. Rhodes, J. Good, M. Good, LL.D., W. Beckett, M. A. Partridge, etc.

After dinner the usual loyal toasts were drunk and suitably honoured.

The Chairman proposed the toast of "The National Federation." It might, he said, surprise some people to learn that the building trade occupied the next position to the agricultural industry of the country. The wages paid last year represented close on thirteen millions, while even in Ireland, with its great breweries and distilleries, not even one of these great industries were "in it" with the building trade. In conclusion, he expressed the regret of all present at the unfortunate absence of Mr. Beckett, the President of the Dublin Master Builders' Association.

The toast was cordially drunk.

Mr. McFarlane, President of the National Federation, responded. The members of the Federation were combined, he said, in order that they might be able to withstand those who would deal unwisely with them, and also to assist one another. The Federation always desired to be conciliatory where disputes arose, and during the last year they had assisted in the establishment of various boards of arbitration which would, they thought, do a great deal to remove the trouble caused by strikes during the last half-century. The workmen on those boards had met the masters, however, in an equitable manner. There was indeed, a desire on both sides to deal righteously with each other, and especially was there a desire on the part of the workmen not to demand too much. There were at present two Bills before Parliament, which would greatly affect the builders—the Workmen's Compensation Amendment Bill and the Trades Disputes Bill—but whatever happened to these measures they would meet their obligations manfully, and if they stuck together they would be able to hold their own.

The Chairman next proposed the toast of "The City and Trade of Dublin." He said their Corporation were often sneered at, but it should be remembered that in recent years they had been engaged in two huge works—the main drainage and the electric lighting works. The city tramway system was amongst the best in the world. He was sorry to say that the building trade was not improving, but they trusted that business in this respect would expand in the near future.

The Lord Mayor of Dublin, in reply, regretted the deplorable condition of trade and commerce in Ireland. The country had not been treated as it should be by the Government under which they lived, especially in the matter of army contracts. He was sure that while their Federation had been formed to protect the employer they would also admit the right of the workmen to organise themselves for an equally laudable purpose. It was those who were outside the trade societies that generally caused all the trouble that arose between the masters and the men.

Sir Horace Plunkett also responded. He trusted the friendly relations between employers and workmen would progress in a manner that would give general satisfaction, and he also trusted that a powerful association like theirs would do all it could to assist the Department of Agriculture and Technical Instruction. The trades unions had assisted them in all possible ways, and he trusted their association would also render all the aid it could in helping to develop the resources of the country. If the Association would assist them in building up city life on its physical side, so as to deal with the social problems of the concentration of population, etc., they would be giving help which was urgently needed.

Sir Maurice Dockrell also responded. He said that one of the greatest factors which militated against the extension of trade in Ireland was the disinclination of the middle classes to embark in trade. Irish youths were put into overcrowded professions, while in other countries business affairs engaged the entire attention of young men. This was an unfortunate state of affairs, and the sooner it was remedied the better it would be for the country.

Sir Antony MacDonnell (Under-Secretary for Ireland) replied to the toast of "Our Guests." He said the buildings with which the members of the Association were acquainted had at least good foundations, but in the building in which a person like himself was employed you could get no foundation whatever. If they asked him what progress had been made in the last three years in building upon that foundation he was afraid he could only point to one or two great features in which there had been progress. He ventured on the last occasion on which he had the honour of partaking of their hospitality to convey a message and to express a warning. The message was one of hope, and it had been fulfilled in the great Act of 1903, which, so far as it had worked, had brought peace and happiness to a multitude of homes; but the warning which he had ventured to express on that occasion had been entirely neglected. Whether that warning had been necessary, or is necessary, the future would tell more certainly than he could. But his own feeling was that the country would suffer from the neglect which was paid to that warning. He came before them that night after three years of work, some of which had brought great satisfaction and some of which had brought regret, and he came before them, as he came three years before, with a message of hope. He was no more entitled to tell them that night the grounds on which the hope was based than he was able to tell them three years ago the grounds upon which his hope was then based; but his firm belief was that the coming year, 1907, would see the fruition of many of those hopes which the best Irishmen had for many years entertained. It might not be the fruition of everything which Irishmen had hoped for, but it would be, he believed, the fruition of so much that Irishmen, if they were true to themselves, would make the fountain and the source from which the whole of their hopes might be fulfilled.

Mr. W. Mitchell (President of the Royal Institute of Architects) and Sir Chas. Cameron also responded.

The proceedings terminated at a late hour.

Correspondence.

STREET NOISE ABATEMENT.—PETITION TO THE HOME SECRETARY:

MOTOR-OMNIBUSES AND TRACTION-ENGINES.

SIR,—The petition to the Home Secretary requesting far more stringent regulations and restrictions concerning motor-omnibuses and traction-engines in the streets of the Metropolis has been well started, and bids fair to be one of the most influential petitions of modern times. The names of the principal signatories having been forwarded to the Home Secretary, I have pleasure in herewith enclosing a copy of the same. It is proposed to keep the petition open until the commencement of the Autumn Session.

THOS. BOWDEN GREEN,
Hon. Sec. Petition Committee.

2, Harrington-gardens,
South Kensington, S.W.

*** A long list of signatories accompanies this letter. The petition is as follows:—

"TO THE RIGHT HONOURABLE THE HOME SECRETARY OF HIS MAJESTY'S GOVERNMENT.

Whereas a very large number of property owners, householders, and other inhabitants of the City and County of London suffer considerable annoyance and inconvenience on account of the noise, smell, dust, vibration, etc., caused by motor-omnibuses and heavy traction engines, unsuitable for crowded or residential districts.

We the undersigned hereby respectfully request the Home Secretary to issue—and cause to be put in force—such regulations and restrictions as may be deemed necessary for the abatement of the above-mentioned nuisances, which are seriously depreciating the value of property and causing a considerable amount of discomfort and injury to health."—ED.

MOTOR-CARS AND DUST.

SIR,—In your last issue it is observed that there does not appear to be anything that can be done in the construction of motor-cars which would mitigate the horrible dust nuisance. Is not such view erroneous? A correspondent in one of the London dailies recently pointed out that something can be done in that direction, namely, the body of the car can be raised a good foot higher from the ground, and the wheels can be constructed as discs instead of with spokes. Such changes in construction would probably considerably lessen the nuisance.

Newark. DRIVEN OFF THE ROADS.

THE PREVENTION OF DUST ON MACADAMISED ROADS.

SIR,—One hears of calcium chloride for this purpose, but why not the whole means of preventing stone from crumbling to dust? I mean first applying silicate of potash or silicate of soda. The road should be thoroughly well made and in good condition before attempting such an experiment. J. K.

LONDON COUNTY COUNCIL LIST OF CONTRACTORS.

SIR,—I notice in your issue of the 28th ultimo you publish a resolution of the London County Council stating that my name be entered upon the list of persons and firms from whom the Council will not in future accept tenders.

I tendered for repairs to schools under schedule for two districts and afterwards ascertained that the Council kept a staff of their own to do part of these repairs, and as I was to be under the same supervision as their own men, it seemed quite clear that the work could be sorted out. This was not stated in the conditions, which were, therefore, misleading, and I think I was quite within my right in refusing to sign a contract in these circumstances. I wrote the Council to this effect (and enclose you a copy of my letter), but I received no reply from them whatever and heard nothing more of the matter until I saw the resolution in the *Builder*.

The manner in which the resolution is set out is detrimental to me unless some further explanation is given, and I trust, therefore, you will see your way to insert this letter in your next issue.

H. KENT.

*** The recommendations were printed in the *Builder* as they appeared in the Agenda paper of the London County Council.—ED.

BOOKS RECEIVED.

MODERN BUILDINGS: THEIR PLANNING, CONSTRUCTION, AND EQUIPMENT. Vol. III. Illustrated. Edited by G. A. T. Middelton, (London: The Caxton Publishing Company, Surrey-street, W.C.)

STRUCTURAL STEELWORK: being Tables, Data, and Formulæ for the Use of Engineers, Architects, and Contractors. (London: Edward Wood & Co., Ltd., Engineers, Manchester; and 88, Cannon-street, E.C. 5s.)

The Student's Column.

ROOFS: STRUCTURALLY CONSIDERED.—IV.

11.—*Tile.*

ROOFING tiles are made from clay prepared and burned in a manner generally similar to that followed in brick manufacture. But as tiles are much thinner than bricks they require a specially tough quality of clay free from stones and prepared with great care.

Tiles for roofing purposes are produced in numerous shapes, and, in addition to the ordinary patterns, several patented tiles are made for which the manufacturers claim special advantages. They are obtainable in red, brown, blue, and "Broseley" colours, the latter ranging through an almost infinite variety of shades from deep reddish brown to blue, and exhibiting the characteristic "bloom" which distinguishes Broseley tiles.

All tiles suffer more or less in quality from the unavoidable difficulty that, if well-burned, they are apt to become warped, and if under-burned they are porous and liable to premature decay.

Tiles showing indications of partial vitrification are the most enduring, as well as the least absorbent.

Good roofing tiles are dense, tough, reasonably non-absorbent, of uniform colour, and good shape, free from stones, giving a clear ring when struck, and showing a clean fracture and fine grain when broken. They rapidly acquire a weather coating which prevents the absorption of water by filling the surface pores of the material.

Inferior tiles are generally of a bright red or earthy red; they absorb water freely, and do not weather readily.

The form of tiles is a matter that should receive attention, for unless roofing tiles are of good shape the courses will not lie close one upon another.

Pantiles are used chiefly for sheds and inferior classes of building, as it is difficult to lay them so as to guard against the penetration of water, snow, and wind.

They partially overlap at the sides, but not sufficiently to make a watertight joint, and, in consequence, are usually bedded in hair mortar and pointed inside, and sometimes outside also. Each tile is moulded with a small projection termed a *nib* or *stubb*, about 1 in. wide by ¾ in. thick, at the middle of the back of the upper end, for the purpose of hanging the tile to the lath or batten.

Pantiles usually measure 13½ in. long by 9½ in. wide by ½ in. thick, and weigh about 5¼ lb. each.

They are laid with a lap of 1½ in., 2½ in., or 3½ in., corresponding to the gauge, or "weather," as it is alternatively termed, of 10 in., 11 in., and 12 in.

As the lap is measured directly from course to course, the gauge is found by deducting the lap from the length of the tile. Allowing for the side lap the effective width of a pantile is 8 in.

The number and approximate weight of dry pantiles per square are given in Table IX. As these tiles absorb a considerable amount of water, and retain it for a long time, a margin of 10 per cent. should be added to the net weight per square of tiling.

TABLE IX.—NUMBER AND WEIGHT OF PANTILES PER SQUARE OF 100 SUPERFICIAL FEET.

Gauge.	Number of Tiles.	Approximate Weight.
10 in.	180	8¾ cwt.
11 ,,	164	7¾ ,,
12 ,,	150	7 ,,

Pantiles are laid on fir laths 1¼ in. to 2 in. wide by ¾ in. to 1 in. thick, or on oak laths 1¼ in. wide by ¼ in. thick, supplied in bundles of twelve laths, each 10 ft. long.

The roof slope for pantiles ought not to be less than 25 deg. from the horizontal.

Foster's Lock-wing Tiles represent an improved type of pantile design, and it is claimed by the makers that these tiles can be fixed by unskilled labour, requiring neither bedding nor pointing, and that, owing to the special form of the side joint, the tiles cannot be blown off, as the lock becomes tighter as air pressure from beneath increases. Fig. 2 is a diagram illustrating the wing-lock adopted in this form of tile.

Double Roll Tiles (Fig. 3) may be described as double pantiles having two main curves, in addition to the lip by which the side joints are made. They are provided with three projecting nibs at the back.

Corrugated Tiles (Fig. 4) are also generally similar to pantiles, but have three or four flutes.

Angular Tiles (Fig. 5) are simply corrugated tiles with angular flutes.

Italian Corrugated Tiles, also termed *Roman tiles*, are made by various firms in patterns which differ somewhat, but may be generally described as having flat surfaces alternating with corrugations, the idea being similar to that embodied in the Italian system of corrugation for zinc sheets (see par. 7). Fig. 6 represents a tile of this form, in which the flutes are slightly tapered so that the upper end of one roll fits into the lower end of the roll above. The tile here illustrated measures 16½ in. long by 14 in. wide, the weight per square (requiring eighty tiles) is about 7 cwt.

Poole's Bonding Roll Tiles are somewhat similar to Italian tiles, but, as shown in Fig. 7, the centre flute in each tile is only continued for a sufficient distance along the lower part of the tile to provide a socket for the lateral joint between two tiles of the next course below. The weight per square (requiring ninety tiles) is about 8 cwt.

Plain Tiles of rectangular form, as illustrated in Fig. 8, measure 10½ in. long by 6½ in. wide by ½ in. thick, and weigh about 2½ lb. each. They are either moulded with two or three *nibs* or *stubbs*, on the top under edge (see Fig. 10), or with two holes for oak pegs (see Fig. 11). For hanging on steep roof slopes these tiles are made with nibs and holes so that they may be secured by nails in addition to the projecting nibs, as shown in Fig. 10.

Plain tiles are also made in two special widths, *half-tile* and *tile and a half*, the former being used to break joint at the end of alternate courses, and the latter in positions where a half-tile could not be fixed efficiently.

The tiles are curved in the direction of their length just sufficiently to give the under surface a slightly concave shape, which has the effect of causing the lower edge of one tile to fit closely against the upper surface of the tile below.

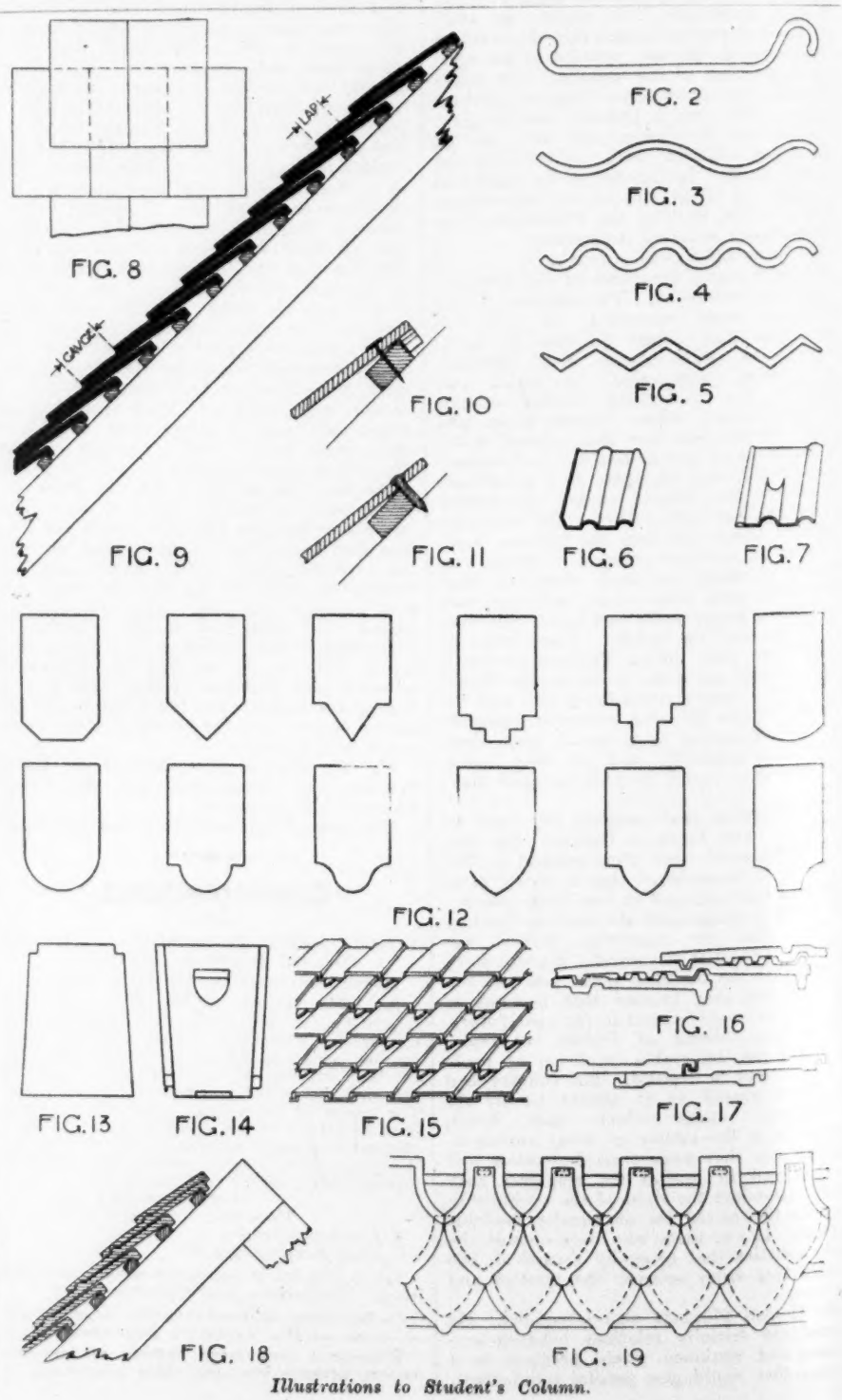
Plain tiles are laid with a lap of 2½ in., 3½ in., or 4½ in., measured from one course to the next course but one below, as shown in Fig. 9. Therefore, as in the case of slates, the gauge is found by subtracting lap from length, and halving the remainder.

Table X. gives the number and approximate weight of plain tiles per square. The best qualities of plain tiles are practically non-absorbent, but for others which are more porous a small percentage should be added to the weight as an allowance for water absorbed.

TABLE X.—NUMBER AND WEIGHT OF PLAIN TILES PER SQUARE OF 100 SUPERFICIAL FEET.

Gauge.	Number of Tiles.		Approximate Weight.
	Net.	With Margin for Waste.	
3 in.	738	800	17 cwt.
3½ ,,	633	700	15 ,,
4 ,,	554	600	13 ,,

Plain tiles are laid on laths similar to those



Illustrations to Student's Column.

used for pantiles and supplied in bundles of 100 laths, each 5 ft. long.

It is open to question whether the practice of bedding the joints is a good one. In its favour it may be said that the work is made more watertight, and that the tiles are less liable to breakage in case workmen have to walk or climb over the tiling. On the other hand, it should be remembered that tiled roofs usually fall into disrepair owing to decay of the laths, and that the effect of mortar is to encourage such deterioration. Moreover, when mortar is employed, the natural tendency of the tiler is to rely upon that material to keep the tiles in place, and consequently to devote less care to the proper hanging and pegging of each tile. Further, all roofs are subject to movements, due to temperature variations and wind pressures, which tend to disturb the mortar and to cause it to fall away from the joints.

Plain tiles can be laid to any slope from 25 deg. to 60 deg., but, having regard to the possible penetration of rain and snow, it is often thought undesirable to give ordinary tiled roofs a pitch of less than 45 deg.

The practice of covering roofs with close boarding and felt, or other suitable sheathing material before laying the laths and tiles is one that should always be followed in good-class work. Boarding alone is not sufficient to stop draughts.

Ornamental Tiles, such as those illustrated by the various sketches in Fig. 12, are generally described as "plain" tiles.

Probably this somewhat inappropriate use of the term arose from the fact that it was necessary to apply the adjective for the purpose of distinguishing between curved pantiles and plain, or plane, tiles. "Ornamental plane tiles" would be a perfectly intelligible designation, but "ornamental plain tiles" is decidedly contradictory.

Ornamental tiles, as we prefer to call them, have the same overall dimensions as plain tiles, and are laid in the same way.

Special tiles of several kinds have been introduced with the object of reducing weight by obviating the wasteful double lap necessary when ordinary, plain, and ornamental tiles are used. It is obvious that by moulding tiles in such shapes that they fit one into another and form watertight lateral joints, the successive courses need only be overlapped to such an extent as to prevent rain and snow from being driven upwards, an effect that can be further guarded against by suitable formation of the upper and lower ends.

Broomhall Tiles, formerly known as *Taylor's Patent Roofing Tiles*, are illustrated in Figs. 13 and 14. They are laid in alternate rows as "channel" tiles with the face uppermost, and as "capping" tiles with the back uppermost, so as to form a roof covering with the appearance generally represented in Fig. 15.

The tiles, which measure 12½ in. long by 9½ in. wide at one end, and 6½ in. wide at the other, are hung on battens 2¼ in. wide by 1 in. thick, and laid with a lap of 3½ in. The channel tiles are first laid in rows at proper distances apart along the slope of the roof from eaves to ridge, the narrow end of each tile being pushed into the wide end of that next below it until the splay *s* fits into an undercut in the shield S of the lower tile. After the channel tiles have been fixed, the capping tiles are laid so as to fill the spaces between the channel tiles. The tiles are fixed by 2¾-in. copper or galvanised iron nails. At the eaves and gables they are double nailed. Hip and ridge tiles are supplied of suitable design to work in with the other tiles.

These tiles form a handsome roof covering, and do not require stronger framework than that usually employed for slates. The number of tiles per square is 185, and the weight per square about 7 cwt.

Major's Interlocking Tiles, shown in section by Fig. 16, afford ample security against the penetration of rain and snow, and are fixed without nails, mortar, or cement. Owing to the double lap for which these tiles are designed, and the weight of the projecting ribs, they form a somewhat heavy roof covering.

Somerset Interlocking Tiles (Fig. 17) are made for single-lapped joints, which are said to be proof against rain and snow. Consequently the weight per square is not much more than half that of ordinary plain tiling. The number of tiles per square is 160, with a 3-in. lap, and the weight per square is about 6·4 cwt.

Rainbar Plain Tiles, laid with double lap, resemble ordinary tiles except that there is a transverse groove on the under side and a corresponding rib on the upper side of each tile, as illustrated in Fig. 18.

Wade & Cherry's Tiles are of the shape illustrated in Fig. 19, and involve the use of far less material than ordinary ornamental tiles. The tiles are hung on battens in the usual manner by means of projecting nibs, and are held together by flanges on the upper and lower ends of each tile, shaped so as to form a dovetailed joint.

In addition to the tiles described above, *ridge*, *hip*, *valley*, and other special tiles for details of roof construction, are made in great variety to suit the pattern of the tiling adopted, and the structural features of the roof to be covered.

LONDON BUILDING ACT TRIBUNAL OF APPEAL.

AT the sitting of the Tribunal on Thursday last week the Chairman (Mr. A. A. Hudson) said the decision of the Tribunal in the case of Lilley & Skinner* was to allow the appeal and reverse the certificate of the Superintending Architect. They would also order the London County Council to pay the costs of the appellants.

Mr. Morseby White, for the London County Council, said he must take the same objection as that taken by Mr. Avory the previous day, viz., that the Tribunal had no power to mulct the London County Council in costs. He also objected to the costs of expert witnesses, whose evidence he contended was not necessary to assist the Tribunal in arriving at a decision.

After some argument the Chairman said the Tribunal would fix the costs at 50*l*.

Mr. Morseby White asked for a case, both as to costs and the building line, to be stated, and this was granted, subject to the question of law at issue being stated.

The Tribunal then proceeded to consider an appeal by Mr. A. Cameron Corbett, M.P., under sect. 19 of the London Building Act, 1894, against an order of the London County Council, dated July 10, 1906, refusing to sanction the formation or laying out of new streets for carriage traffic upon the St. German's estate, Catford, leading out of the south side of Downhill-road. Mr. Cunningham Glenn appeared for the appellant and Mr. W. R. Adkins, M.P., represented the London County Council.

Mr. Glenn took an objection to the London County Council appearing in the case except as parties to it, but the Chairman overruled the objection. It was, he said, clear that the Council had a right to be present, but as to whether they were there in the capacity of parties to the case was a matter of law they were not competent to decide.

Mr. Glenn then opened the case for the appellants. He said that Mr. Corbett had a large estate at Catford, most of which had been laid out by the sanction of the London County Council. The streets for which permission were now asked formed the concluding portion of the estate, and the ground on which the Council had refused to sanction the plans submitted to them was that because one of the new streets would not afford direct communication between two other streets in the same property. His client was perfectly prepared to meet any reasonable requirements of the Council in the matter.

Mr. Adkins said that the only interest the London County Council had in the matter was to see that the estate was developed in such a way that the public were not inconvenienced.

After a lengthy consultation between counsel and the Tribunal the Chairman announced that the Court would allow the appeal, the appellant by consent undertaking not to build permanently over or prevent the continuation of Ardock-road and Muirkirk-road up to the boundary of the Corbett estate at a point to be indicated on a plan which the Tribunal would prepare before September 29, 1911, the undertaking to be in such a form, if not agreed between the two parties, to be settled by the Tribunal, and the London County Council to be at liberty to apply to the Tribunal before the expiration of five years, for an extension of the time.

No order was made as to costs.

PROPOSED NEW THEATRE, TWICKENHAM.—It is proposed to erect a new theatre at Twickenham in the Hampton-road. Shops and residential flats are included in the scheme. The architect is Mr. A. Parry Fielder. The theatre will be built of fire-resisting material, and is to accommodate some 2,000 persons.

* See our last issue, p. 184.

Obituary.

MR. R. H. MIDDLETON.—We regret to announce the death of Mr. R. H. Middleton, Borough Surveyor of Walsall, which took place in London on Saturday last. The late Mr. Middleton, who was fifty years of age, and who leaves a widow and a son and daughter, went to Walsall about sixteen years ago from Birkenhead, where he had been deputy surveyor. He received his training in the office of Mr. Horsfall, who was an architect and railway engineer in large practice at Halifax. Previous to going to Birkenhead, Mr. Middleton had held an appointment as assistant surveyor at Dewsbury, in Yorkshire. He was an Associate of the Institution of Civil Engineers. At Walsall he was able to render valuable service in some of the more important works undertaken by the municipality.

General Building News.

ROMAN CATHOLIC SUNDAY-SCHOOL, BRADFORD.—On the 4th inst. the foundation-stones were laid of a new Sunday-school in connexion with St. Cuthbert's Roman Catholic Church, Manningham. The building comprises on the men's side three rooms, one of which is being prepared as a gymnasium. On the girls' side there is to be one large room, 28 ft. by 20 ft. On the floor above will be an assembly hall, 40 ft. square, with two stone staircases and with ante-rooms on either side of a raised platform. The designs have been prepared by Mr. W. H. Herbert Marten, architect, of Bradford. It is intended ultimately to erect a convent on a portion of the site which is in hand, and Mr. Marten's design includes this building.

COUNCIL SCHOOL, NEWCASTLE-UPON-TYNE.—On the 2nd inst. the new Council school at Wingrove, Newcastle, was opened. The school provides for the education of 1,260 children—420 seniors, 420 juniors, and a similar number of infants. There are two blocks, and in the larger one the juniors, boys and girls mixed, will occupy the ground floor; while the seniors, also mixed, will be located on the upper floor. It is a two-storied building. The other block will be used by the infants. The exteriors are of red brick—Lowry second quality facing bricks—with Denwick stone facings; and inside there is a dado running throughout of Lumley white glazed bricks to the height of 4 ft. The ground floors are of pitch-pine wood blocks, and the upper floors of pitch-pine flooring. Each school has seven classrooms and a central hall, and there are also private rooms for teachers. The premises are lighted by means of incandescent inverted burners. The work has been carried out from the plans of Mr. Chas. Walker, architect of Eldon-square, the general contractors being Messrs. Parkinson & Sons, Newcastle. The plumbing work has been done by Messrs. J. Tweedle & Co.; the heating by Messrs. Dinning & Cooke; the slating by Mr. Chas. Nicholson; and the sanitary goods have been supplied by Mr. W. E. Farrer, of Birmingham.

UNIVERSITY COLLEGE SCHOOL.—Sir George Barham, Mayor of Hampstead, laid the foundation-stone of the new buildings at Frognal on July 25. In our number of February 4 last year we published Mr. Arnold Mitchell's designs, selected in competition, which will be carried out at an estimated total expenditure of 110,000*l*., including the cost of the site and equipment.

WORKMEN'S DWELLINGS, WESTMINSTER.—The Mayor, Major-General Lord Cheylesmore, recently opened the Council's new workmen's dwellings at Marshall-street, W. These dwellings have been erected by the Westminster City Council, from the designs of Messrs. Joseph & Smithem, upon a small site with a frontage to Marshall-street of 72 ft., containing a superficial area of about 3,255 ft. The building is five stories in height, including half basement and an attic story, and is faced with red Leicester bricks relieved with dressings of stone. The staircase walls have been faced with marble mosaic. The floors throughout are of fireproof construction, and the pavings and landings are formed of granolithic material. The lavatories are paved with mosaic and the walls thereof have a similar dado. The buildings contain ten three-room tenements and ten two-room tenements; a total of twenty tenements containing fifty rooms, which will house about 100 persons. All the tenements are self-contained. The Council propose to charge 11s. and 11s. 6d. (according to position) for the three-room tenements and 8s. and 8s. 6d. for the two-room ones. The cost of the buildings will be about 4,600*l*.

PAROCHIAL HALL, SHIELDFIELD.—The plans for the new parochial hall in connexion with St. Jude's Church, Shieldfield, Newcastle, have been approved by the trustees and the Town Improvement Committee, and tenders for the work will shortly be received. The plans have been prepared by Mr. A. B. Plummer, architect, Newcastle. The site is at the corner of Rosedale-place and Rosedale-street. The present width of

Rosedale-place will be increased to 50 ft. There will be a frontage of about 109 ft., 22 ft. of which, at the south end, will be an existing house, which is to be the caretaker's residence. There will be a frontage of about 64 ft. to Rosedale-place, and about 81 ft. to the back lane. Some houses on the site will be removed. The ground along Rosedale-street frontage will remain; the back lane, however, will be raised 8 ft. at Rosedale-place end and 18 ft. at the other end. The main entrance will be at the corner of the two streets; and there will be an entrance lobby and main stair leading to the first floor. From the lobby access is obtained to the main ground floor hall, 67 ft. by 45 ft., which will seat 500. Externally the building will be faced with red bricks with stone dressings, and with moulded brick architraves around the windows and doors. The first floor windows will be circular. In harmony with St. Jude's there will be brick pilasters and eaves and corbel tabling. The roof will be covered with green slates. The building will be heated with hot water pipes and with open fireplaces.

ELECTRICITY SCHEME, BRIGHOUSE.—The members of the Brighouse Town Council, at a meeting of the General Purposes Committee held on the 1st inst., decided to promote a scheme of electric light and power supply, combined with the provision of a destructor for dealing with the refuse in the sanitary department. The matter came before the Council in the form of a report from the joint sub-committee appointed to deal with the subject nine years ago. This report was accompanied by a report from Messrs. Lacey, Sillar, & Leigh, electrical engineers and experts, and also by a report from the Borough Surveyor (Mr. S. S. Heywood) dealing principally with the erection of the buildings. The scheme will involve at least an expenditure of about 25,000*l*. It is proposed to place the combined electrical and destructor works on the site of the burned-out Alexandra Silk Hill, which is centrally situated, and yet not surrounded by residential property.

RESTORATION OF BIRSE CASTLE.—Forest of Birse Castle, which for many years was a ruin, has now been completely restored. The carrying out of the work was entrusted to Mr. George Bennett Mitchell, architect, Aberdeen, and the contractors were as follows:—Masons, Messrs. Anderson & Leslie, Torphins; carpenters, Messrs. W. Duguid & Son, Ballater; plasterers, Messrs. Mitchell Brothers, Ballater; slater, Mr. J. Durnin, Aberdeen; painters, Messrs. G. Donald & Sons, Aberdeen; plumber, Mr. Peter Stewart, Aberdeen; grates, Messrs. J. Bannochie & Son, Aberdeen; furnishings, Messrs. Maple & Co., London; metal work, Messrs. G. & W. Miller, Aberdeen; and roads, Messrs. J. & H. Davidson, Banchory.

ALTERATIONS TO THE BOROUGH THEATRE, STRATFORD.—The Stratford Borough Theatre has just been reopened, after having undergone various alterations and improvements. The decorations have been carried out by Messrs. J. De Jong & Co., Camden Town, under the personal direction of Mr. Hellier Pyke, architect to the firm. The carpeting has been done by Messrs. J. R. Roberts, Ltd., and the seating by the Hackney Furnishing Company, Ltd. The electric lighting has been re-installed by the West Ham Corporation.

YORK MINSTER.—The Dean of York has issued his ninth occasional paper upon the restoration of York Minster. It contains a dozen full-page illustrations, many of them showing the progress of the work. The results of the last year's operations, says the Dean, are not so apparent as heretofore, but have nevertheless kept a large staff fully employed. A hundred years ago, when the west front was carefully, though not scientifically refaced, large plates of "Hartley's rough patent glass" were inserted to protect the mediæval glass of the west window. The former glass has now been removed and replaced all over by clear "crown glass" in diamond quarries, and the stone mullions have been thoroughly repaired. This west window, which, as will be remembered, fell into the hands of William Peckitt, contains a large admixture of XVIIIth century glass. But, besides being, as the Dean thinks, not unworthy of the position which it holds in the Minster, it is almost the only one in the building which can be attributed to a definite donor, being due to Archbishop Melton (A.D. 1317-1340), of whom the Dean adds an interesting account. His register shows that in 1338 he gave 100 marks "pro opere vitreo fenestrae ex capite occidentali . . . de novo constructae." The other work upon which progress has been made has been the construction of the much-debated flying buttresses with their pinnacles. The Dean does not expect that the difference of opinion about them will be unanimously settled, but he suggests that the warm approval of what has so far been done in the matter will increase when the series is complete. The photographs tend to confirm his hope and to support his view that "nothing could exceed their grace and beauty." Mr. Bodley writes that "the artistic effect is to again lift that side of the Minster to its due proportion, and the constructional gain is the added strength—for its longer continuance." During the year ended June 16, 1906, a sum of 623*l*. was subscribed to the restoration fund, and over 23,000*l*. has so far been expended. Further help is needed.

Sanitary and Engineering News.

PROPOSED SEWAGE DISPOSAL WORKS, OLDBURY.—On the 30th ult. Colonel W. R. Slacke, an inspector appointed by the Local Government Board, held an inquiry at the Public Buildings, Oldbury, into the application by the Oldbury District Council for sanction to borrow 38,300*l*. for the improvement and extension of the Oldbury sewage disposal works, including the execution of works in the Rowley district. Mr. W. Shakespeare (clerk) explained that land had been purchased at a cost of 1,719*l*. Mr. T. H. Shipton (Surveyor) stated that it had been necessary for some years to improve the system of sewage disposal at the works. He gave details of the existing works, and mentioned that it was proposed to make extensive alterations to the plant and system of dealing with the sewage. He considered it would be about three years before the whole of the works were completed, but it was hoped to purify the sewage in a much shorter period. The extensions had been rendered necessary by the increasing population in the district, and also the presence of trade waste in the sewage. Professor Frankland also gave evidence. He said the Oldbury sewage was very difficult to deal with, because a large proportion of it was made up of chemical trade waste. Experiments had been made since 1903, and the present system was considered to be the best.

CAPE TO CAIRO RAILWAY.—The late Mr. Alfred Beit has bequeathed 1,000,000*l*. sterling towards the accomplishment of Cecil Rhodes's vast project. The work is undertaken in sections of about 1,000 miles apiece. Thus far the line, of which 2,100 miles are practically completed, advances from Cape Town to a point nearly 300 miles distant, northwards, from Victoria Falls, and is rapidly drawing near the boundary of the Congo Free State. It is anticipated that Mr. Beit's bequest will be applied to extending the line in Rhodesia and northwards of the Zambesi where are rich copper deposits and goldfields and the Wankie coalfields near the Victoria Falls. Sir Charles Metcalfe's engineering staff are now engaged in completing the next section through the elevated tableland intersected by the river Kafue beyond the Broken Hill country wherein are valuable zinc and copper mines, with the object of reaching the copper deposits and the green malachite caves on the borders of the Congo Free State. In a statement recently made by Sir Charles Metcalfe, and published in the *Times*, he says that the direct line will probably branch away at Broken Hill and will go to the south end of Tanganyika, and that in his opinion a railway line should be made northwards through Congo Free State to traverse the French territories and end at Algiers or some other port in the Mediterranean. In the north-east part of the continent there seems to be some prospect of the construction of another great dam across the Nile at Roseires, with an extension from the Uganda railway to the Victoria Nyanza and thence to Lake Tanganyika, which is about 650 miles distant. As Sir Charles Metcalfe observes, the entire scheme would be completed by joining up the Uganda Railway with Khartoum, the line of 600 miles through their own territory being made by the German Government.

Foreign.

FRANCE.—The Académie des Beaux-Arts has awarded the Grand Prix de Rome in the architectural section to M. Bonnet, pupil of MM. Daumet and Esquié. The subject for the competition was a new building for the Collège de France. The Rouyer prize was awarded to MM. Bernard Haubolet and Pierre Paquet, *ex æquo*. ——The Lycée St. Louis has been the subject of important works of alteration and enlargement, necessitated by the prolongation of the Rue Vaugirard to the Boulevard St. Michel. The cost of the new buildings is estimated at more than 2,000,000 francs.——A monument to Gounod is to be erected at St. Cloud. It will include a portrait bust which was executed by the late Carpeaux ——M. Dernaz, Inspecteur des Bâtiments Civils, has been appointed architect to the Luxembourg, in succession to the late M. Scellier de Gisors; and M. Nénot has succeeded the same architect as Inspecteur des Bâtiments Civils.——Important works of restoration are to be carried out at the Palais de l'Elysée, for which M. Bonnier has been appointed architect.——A new Custom-House is to be built at Nantes, at an estimated cost of 600,000 francs.——M. Meinvielle, architect, of Bordeaux, has been elected President of the Société des Architectes du Sud-Ouest.——There is a proposal to construct a barrage, with a bridge road-way, between St. Malo and Dinard, and also to form a dock or basin in deep water at St. Servan. The barrage would cost 800,000 francs, and the dock 37,000,000 francs.——A monument to Villiers de l'Isle Adam is to be erected at St. Brieuc. M. Le Goff will be the sculptor.——A large viaduct is to be built over the Rance, between Port Saint-Jean and Port St. Hubert. It will be a steel bridge, 225 mètres in length over all, with a central span of 165 mètres, at a height of 30 mètres above the mean water level. M. Harel de la Noë is the engineer. ——A Franco-Italian committee has been formed to erect a statue to the memory of Lamartine, at La Mergellina, on the Bay of Sorrento.

GERMANY.—Speculation, which has already sacrificed so many ideal buildings to material ends, is now threatening one of the most charming spots in the neighbourhood of Leipzig. If the proposed new street of prosaic flats be built it will rob Schloss Gohlis of its greatest charm, which is derived not only from the daintily decorated building, dated 1755, but from the laying out of the grounds with arcaded paths, statues, arbours, and picturesque enclosing walls. Schiller was a daily visitor to the "Poet's Walk" during his stay in Gohlis.——On July 11 died Walter Körber, aged forty-five. Amongst other works, as Principal of the Surveyors' Institute he made elaborate measured drawings of Strassburg Cathedral and prepared plans for the restoration of the Gross-Salze Church, near Magdeburg. The Prussian Board of Public Works has lost in Körber one of its most valued officials.

AUSTRIA.—On June 17 the new bathing establishment was opened in Carlsbad. It is built in the Empire style, from the designs of Herr Drobny, of Carlsbad. The buildings contain forty-two mud baths, twenty-nine shower baths, fifteen carbonic acid gas baths, two halls with cubicles for mud poulticing, rooms for cold water treatment, etc.——A limited company has been formed which proposes to build some much-needed baths in Innsbruck. These will include an open-air swimming bath, 35 mètres long, in which waves will be mechanically produced; a covered swimming bath, 23 mètres long, which can be warmed in the winter; a vapour bath, etc.——One of the most interesting features in the Health Exhibition in Vienna is the Mining Section. The tragedy of Courrieres has drawn the attention of the public to the precautions taken for safety and especially to the contrivances resorted to for rescue. The exhibition shows how Austria takes a leading place in the practical methods she adopts in mine rescuing operations.

ITALY.—Signor Marzocchi, engineer, has been making experiments with ferro-concrete in order to discover a method by which this material may be used with economy in ordinary dwelling-houses in Italy. According to his project, a ferro-concrete floor can be laid which in point of cost and lightness of construction compares favourably with the ordinary wooden floor.——Signor Revessi, in an article on higher technical education, urges reform in these matters, as most of the higher posts in the technical schools are now held by foreigners, Swiss, Germans, and Belgians. Not only are Italians thus thrust into the background, but the foreigners do not attempt to disguise their contempt for the country which befriends them. If industries could be nationalised as in Hungary, a new and powerful barrier would be opposed to the mad but significant dreams of Germanophiles.——In a few months the Simplon Tunnel line will be added to the list of electric railways. Messrs. Brown, Boveri, & Co. will supply the locomotives, which will be of the same type as those in use on the Lecco-Colico-Chiavenna line.

SWITZERLAND.—Plans are invited from foreign architects for a library to contain 400,000 volumes, to be built in Freiburg in connexion with the University. Particulars to be obtained from the "Kantonal Baudirektion," Freiburg. Latest date for sending in plans, September 30, 1906.

Miscellaneous.

THE HOUSING PROBLEM IN LIVERPOOL.—The City Council have had before them a report of the Housing Committee on Councillor Morrissey's motion, which asked the Corporation to put into force part 3 of the Housing of the Working Classes Act, 1890, and to instruct the Housing Committee to prepare a scheme for the erection of houses in the outlying districts of the city on land in possession of the Estate Committee, or on any other suitable sites. In accordance with the standing orders, Mr. Morrissey's motion was sent, before being discussed, to the Housing Committee for a report. This report they have now prepared, and it is as follows:—"The committee's housing operations have hitherto been confined to providing accommodation for those dispossessed from properties dealt with by the medical officer of health, and the greater portion of building work has been carried out under part 3 of the Housing of the Working Classes Act, 1890. The object of the motion, as expressed by its mover in committee, is the provision by the municipality of houses for

artisans, etc., at rentals of from, say, 7s. to 9s. weekly, with the view to the development of the suburbs by the erection of commodious houses to be let at low rentals and having more air space than is given to dwellings of this class at present being erected by private enterprise. He does not suggest any scarcity of accommodation for the class of people proposed to be catered for. The committee have ascertained that during the last five years about 2,000 houses, at rentals ranging from 12*l.* to 18*l.* per annum, and about 4,500 houses, at rentals ranging from 18*l.* to 25*l.* per annum, have been erected by private enterprise in the outlying districts. The inability of the Corporation to compete with private enterprise as regards cost of building for ownership properties of the class proposed, and the fact that both interest and sinking fund charges have to be provided out of revenue, cause the committee to have serious doubts as to the Council being able to offer inducements in respect of rental if the undertaking proposed is to be conducted on a commercial basis. The stringency of the building by-laws in the city has from time to time been increased, and the committee is of opinion that if anything in the direction of more air space is necessary, it is a matter for the Health Committee to deal with. Failing a want of accommodation the committee do not recommend the Council to enter into competition with private enterprise in the direction suggested." Accordingly, this report is a report by the City Surveyor (Mr. Thomas Shelmerdine), who has ascertained from the building surveyor (Mr. Goldstraw) that the number of houses from 12*l.* to 18*l.* rental per annum erected during the past five years by private enterprise is:—Old City, 307; Wavertree, 529; Toxteth Park, 52; Walton, 294; West Derby, 795; Garston, 212—total, 2,189. Rentals from 18*l.* to 25*l.* per annum:—Old City, 261; Wavertree, 766; Toxteth Park, 192; Walton, 1,540; West Derby, 1,619; Garston, 214—total, 4,592. The Head Constable's returns show that in December last there were vacant houses at rentals under 5s. a week and over 5s. a week as follows:—Old City, under, 903; over, 1,633; Wavertree, under, 45; over, 283; Toxteth Park, over, 299; Walton, under, 69; over, 298; West Derby, under, 93; over, 618; Garston, under, 3; over, 109; total under 5s., 1,113; total over 5s., 3,240. The latter statistics are, says the surveyor, given for what they are worth; they do not discriminate the various rentals over 5s., and no doubt quite a number of these would be much in excess of that rental. The surveyor further states that the houses in the outskirts would have to yield 5 per cent. per annum net over the full period of a loan raised (sixty years for buildings and eighty years for land) in order that the ratepayers should not suffer financial loss. If the ratepayers are to suffer no loss, the surveyor thinks the houses such as Mr. Morrissey desires to be erected would have to be let at 11s. per week, which, with 2s. added as the cost of the means of conveyance, would be a very large proportion of the earnings of the possible tenant.

TOWER-BUILDINGS, LIVERPOOL.—Tower-buildings, Water-street, for many decades a landmark and familiar institution, at the bottom of Water-street, is soon to be a thing of the past, giving place to a proposed new building. The Corporation of Liverpool are lessors of portion of the site, and the City Council will be asked to sanction an arrangement agreed between the Estates Committee and the lessees (the Right Hon. Joseph Russell, Baron Glanusk, and others), by which (1) the Corporation are to consent to the absorption of a portion of Prison Weint in the building site, the main new building line to be a continuation of the east side of Back Goree; (2) the lessees to give up the portion of the site required for the widening of Water-street; (3) the Corporation to extend the term of the leasehold portion of the building to ninety-nine years from February 1, 1907, to the lessees; (4) the lessees to pay to the Corporation the sum of 1,000*l.* as an equality of exchange; (5) the owners to construct the new buildings so as to leave a passage from the Old Churchyard to the front of the building leading to Prison Weint and the Pierhead; (6) the new buildings to be erected in accordance with the elevations submitted to and approved of by the Estate Committee; (7) the Corporation to be free from any responsibility as to any right of way over Prison Weint; (8) the corporation to remove such material as they may desire in either the wall or on the surface of Prison Weint; (9) the arrangement to be subject to the consent of the Local Government Board being obtained, to the extension of the lease to 99 years, and to the authorities concerned approving of the absorption of the portion of Prison Weint and to a building line being prescribed in Water-street.

HOUSE OF COMMONS VENTILATION.—The report by Dr. M. H. Gordon on an investigation of the ventilation of the Debating Chamber of the House of Commons was issued on the 31st ult. as an appendix to the recent Parliamentary Paper on the subject. It is of a highly technical character. Three problems were formulated at the beginning of the report as summarising the main points requiring investigation. These problems are as follow:—(1) The relationship, if any, between the ventilation of the Debating Chamber and the spread of influenza; (2) The extent to which the air in the Debating Chamber is liable to pollution from material continually being brought in upon members' boots, the exact nature of such material, and its capacity, actual and potential, of producing disease; (3) the reason of the want of freshness in the air of the Debating Chamber, and especially the nature of the fault in the ventilation causing in members the undesirable symptoms drawn attention to in the report of the Ventilation Committee in 1903. In regard to the first point there is reason to believe that the mode of infection in the vast majority of cases of influenza is by the inhalation of particulate material disseminated from the mouth and upper respiratory passages of a person infected with the specific micro-organism of the disease. Such persons are liable to give off the *materies morbi* when they cough, sneeze, or loudly articulate. According to a passage in the report of the Ventilation Committee, at a time when influenza was prevalent, members still in a convalescent stage of the disease were present during a debate. These members would be liable to transmit the infection by giving off particulate matter in performance of the acts above mentioned. Respecting the second point, it is stated that pollution from material brought in upon boots was found to occur chiefly behind the Speaker's chair and at the side gangways. Bacteriological analysis distinctly emphasises the desirability of excluding pollution of the air from this source as far as possible. In reference to the third point, it is held that the "want of freshness" was probably the result of a number of causes. A distinct improvement in the quality of the air, as judged by the subjective senses, was perceptible after the changes previously recommended had been carried out; and as the quantity of air passed through the Chamber is now double as great as under the old conditions, and sometimes more than double, it seems clear that one of the chief reasons of the complaint was the deficient supply of fresh air. There is good ground for believing that further improvement in freshness of the air, not only in the Debating Chamber floor area, but in the galleries and also in the division lobbies, will be perceptible when the recommendations based on the results of the present investigation have been carried out.—*Morning Post.*

WATER SUPPLY TO TENEMENT HOUSES.—The Medical Officer of Health for Chelsea, in his annual report which has just been issued, points out that, owing to the decision of the Marylebone magistrate, which was exactly the reverse of the decision previously given by the Woolwich magistrate, it was evident that before any steps could be taken—in the words of the London County Council—to secure the provision of a proper and sufficient supply of water for the tenants of every floor of a tenement house, it will be necessary to have an amendment of sect. 48 of the Public Health (London) Act, requiring in terms the provision of water supply and water supply fittings to every floor of a tenement house which is let in separate tenancies on the various floors. In his (the Medical Officer of Health's) opinion, a plentiful supply of water within easy reach of the upper tenements of a house would not carry with it its full advantage unless means were also adopted for enabling the tenants to dispose of their dirty water and slops with the same facility that they obtain clean water. This means the provision of slop sinks for the discharge of foul water from the upper stories and would in many instances necessitate structural alterations to the houses, and if enforced by the Borough Council an important extension of the scope of the work undertaken by the Public Health Department.

PROTECTION OF ANCIENT MONUMENTS.—Mr. Ralph Nevill, F.S.A., hon. secretary of the Congress of Archæological Societies, has forwarded the following letter to the Prime Minister:—"By direction of the Congress of Archæological Societies in union with the Society of Antiquaries of London I have the honour to send you the following resolution unanimously passed at their meeting held on July 4, 1906, under the presidency of Lord Avebury:—'That this Congress regrets that the Government has not carried out the provisions of the Ancient Monuments Protection Act for the appointment of an inspector. Various monuments have been placed under the Act on the faith that the provisions of the Bill would be observed; the Congress, therefore, urges that an inspector of ancient monuments should be appointed in accordance with the Act.' I have been requested to say further that the Congress quite recognises the desire of the Government, in the arrangements that have been made, to protect the ancient monuments that have already been handed over to the care of the nation, and it has no intention of questioning either the zeal or ability of the official entrusted with the duties. I am instructed, however, to point out that it was intended by the Bill that the inspector should be a man of independent position, able to devote much attention to the duties of the office, and that these were intended to include, not merely the care of such monuments as were named in the Act, but an official *status* which would enable him to intervene for the preservation from destruction of other similar monuments. The experience of the committee of the Congress formed for recording earthworks shows that such an inspector might be of the greatest service in preserving from destruction those important relics of the past. It is obvious that duties of this description cannot be adequately discharged by an official in Government employ who has other important duties to fulfil, and who does not possess the *status* contemplated in the Act. A salary is provided by the Act for the office of inspector, and I am to submit that this sum which is annually voted by Parliament should not be diverted by repayment to the Treasury as has been done for some years. The Congress wishes to call your attention to the statement made by the First Commissioner of Works (Hansard, August 3, 1900):—'It has been thought advisable not to make any appointment immediately, so that some indication may first be gathered of the probable effect of this year's resolution for the extension of the Ancient Monuments Protection Act.' On behalf of the Congress, which represents forty of the principal archæological societies in England, Ireland, and Wales, and some 12,000 members, I am to respectfully pray that you will see fit to revert to the original practice of appointing an independent inspector."

HYGIENIC STREET PAVING.—The Medical Officer of Health of Battersea, in his annual report which has just been circulated, states that in 1904 the Public Health Committee addressed a communication to the Highways Committee asking that body to take into consideration the question of paving the carriageways of certain side streets, particularly those in which diarrhœa had been prevalent in previous summers, with an impervious paving such as asphalt. The Highways Committee decided to give this form of paving a trial, and during the year the carriageways of fourteen streets were paved with tarred-slag macadam. This material gives a smooth impervious surface, and is much less expensive than asphalt. In 1905 further progress was made with the paving of street carriageways with impervious pavings, and during the year twenty-one streets (33,134 sq. yds.) were paved with tarred-slag macadam. In July, 1905, however, the Council decided to suspend any further use of this paving material for a period of at least twelve months, in order that its utility might be more severely tested. "It is to be regretted," the Medical Officer continues to write, "that the development of this important work should have been postponed, for although differences of opinion existed as to the value of tarred-slag macadam as a paving in main streets, there were none as to its value in side streets. The importance of impervious carriageway paving in urban sanitation cannot be too strongly emphasised, and it is to be hoped that the Council will see their way to make a much more extended use of this form of paving in the future. The advantages of impervious paving in connexion with the prevention of infantile mortality are manifold."

Legal.

ACTION BY ARCHITECT FOR FEES.

THE case of Wakley *v.* Durant came before Mr. Justice Lawrance on the 4th inst., an action by Mr. Horace Wakley, an architect and surveyor, of Adam-street, Adelphi, to recover from the defendant, Mr. Edward Durant, a sum for architect's fees.

Mr. Trevor Lloyd was counsel for the plaintiff, and Mr. Liversidge for the defendant.

Mr. Lloyd, in opening, stated that the plaintiff was instructed in 1901 to draw out plans and specifications with the view to the building of a house at Sunningdale for the defendant. Plaintiff was told to prepare the plans for a house that would cost about 2,000*l.* Plans were accordingly drawn on this basis. Defendant, when he saw the plans, said the rooms were too small, and he began to suggest various alterations and extensions in the plans. Plaintiff pointed out that this would increase the cost, when the defendant replied that a little more or less did not matter. Defendant arranged for a house without a drawing-room, but as his daughter objected to this a drawing-room was added to the plans. Eventually the plans were agreed upon, and it was arranged that the plaintiff should procure tenders from builders. Tenders were invited, and the result was that the lowest tender was for 3,450*l.* Defendant said that was rather a lot, but plaintiff went so far with the matter *as* to send down and plug out the ground. Eventually, however, the defendant decided not to build. Plaintiff had waited, and not having his account paid now sued to recover the amount, and his charges were based on the scale of the Royal Institute of British Architects, viz., 3 per cent. on the estimated cost of the work. When the plaintiff wrote for money on account, the defendant replied offering the plaintiff 20*l.* for out-of-pocket expenses. Plaintiff would not accept that offer,

but asked for a cheque for 50*l.* on account. Eventually plaintiff said he would settle the matter by accepting 86*l.* 5s., but this the defendant refused to pay.

Plaintiff was then called and gave evidence in support of his counsel's opening statement. He said the site was on the side of a hill, and a more costly site to erect a house upon he did not know, and this he pointed out to the defendant. He based his charges on the scale of the Royal Institute of British Architects. The house had never been built.

Cross-examined,

A suggestion was not made by the defendant that the cost should not exceed 1,500*l.*, neither did the defendant suggest that he should correct his plans so as to reduce the cost to 2,000*l.*

Mr. Wm. Woodward, architect, of Southampton-street, Strand, said he had examed the plans drawn by the plaintiff, and his charges were fair and reasonable, and in accordance with the scale of the Institute.

This was the plaintiff's case.

Mr. Liversidge, for the defendant, said the defendant was desirous of building a house at Sunningdale, and he wanted plans of a house which would cost a certain amount of money only. When he instructed the plaintiff to draw the plans he told him that he only intended to spend 1,500*l.* There were, however, certain alterations in the plans, and the plaintiff was asked what the house would cost, and he said they would not exceed 2,000*l.* Defendant only instructed the plaintiff to draw the plans on the understanding that the house was not to cost more than 2,000*l.* He gave the plaintiff a working margin of 500*l.*

Defendant was called, and said he was a partner in a firm of merchants in Wood-street, E.C. When he gave the plaintiff his instructions he told him not to go beyond 2,000*l.* for the house. He made it perfectly clear that he would not go beyond 2,000*l.*

Cross-examined,

His opinion was that the plaintiff was only entitled to out-of-pocket expenses, as he had done work that was absolutely of no use. He thought the house could have been built for 2,000*l.* at the time, but after seeing the tenders he found he could not get it for that sum.

Mr. Ernest Flint, architect, examined, said that in his opinion if instructions were given for a house costing 2,000*l.* plans should be drawn accordingly. If plans were drawn for such a house, and the tenders came out at over 3,000*l.*, that would not be a fulfilment of the instructions given.

His lordship: But if a lot of additions were made to the plans you would not then expect the house to cost only the original amount?

Witness: No; but I should have pointed out that those were extras, and would have to be added to the 2,000*l.*

Cross-examined,

If the plaintiff was entitled to call for tenders he would be entitled to 3 per cent. on the lowest tender, and his charges were, on that assumption, fair and reasonable.

In the result his lordship said he thought his judgment must be for the plaintiff for 85*l.* on the ground that there might have been some misunderstanding between the parties. His reason for coming to this conclusion was that there was not a single word in the whole correspondence which confirmed the defence set up that day.

Order accordingly.

ACTION BY A QUANTITY SURVEYOR FOR FEES.

THE case of Thompson *v.* the Westminster Contract Corporation and others came before Mr. Justice Darling and a common jury in the King's Bench Division on the 3rd inst.

Mr. F. Lowe, K.C., in opening the case, said the action was originally brought by the plaintiff, Mr. William Thompson, a quantity surveyor, against three defendants, one of whom was Mr. James D'Oyley, an architect, but so far as he was concerned it had been arranged between himself (counsel) and Mr. Ashton, who appeared for Mr. D'Oyley, that the latter should be struck out of the action on certain terms which had been agreed upon. There was no suggestion of any sort against Mr. D'Oyley.

Mr. Ashton said he agreed to this, and left the court.

Mr. Lowe, continuing, said the other defendants were Sir William Earle and the Westminster Contract Corporation, and the plaintiff brought the action to recover the price of work and labour done in respect of bills of quantities and other work in regard to certain proposed buildings. The plaintiff was instructed by Mr. D'Oyley, who was acting as the agent of the defendant corporation and the defendant Sir William Earle, and these two defendants denied that Mr. D'Oyley was acting as their agent. Sir William Earle was a bankrupt. The plaintiff's claim was for 346*l.* 15s., and the work in question was in respect of a large block of buildings which it was intended to erect on a part of the Duke of Bedford's estate in Russell-street, Covent Garden. The defendant corporation were engaged in the financing of this project. Sir William Earle was a clergyman and, as unfortunately he was a bankrupt, he was not represented in these proceedings. Naturally, as Sir William Earle was a bankrupt and unable to pay the plaintiff for the work he had done, the defence to the action put forward by the corporation was that Sir William Earle was the only person responsible. So the only question the jury had to try was whether the work was done on the joint order of the corporation and Sir William Earle, or whether the latter was the only person liable to pay the money. If Sir William was the only person liable plaintiff would have to prove against his estate, and nobody could suggest that that would be a very profitable undertaking. The history of the case was very short. The managing director of the defendant corporation was a gentleman named Allbutt, and the instructions that were given to get out the quantities for the work, and which were essential to its progress, were given by Mr. Allbutt. He thought the letters established beyond dispute that the work was being done at the request of the corporation and that on their instructions Mr. D'Oyley in his capacity as the corporation's architect instructed the plaintiff to do the work. If that was so there was an end of the case. There could be no question that when anybody employed an architect to get out plans, and told him to have the quantities properly prepared, that person would be liable for the quantity surveyor's charges. He should establish beyond dispute that Mr. D'Oyley was the architect for the corporation, and to the knowledge of the managing director of the corporation the plaintiff was instructed by Mr. D'Oyley to prepare the quantities, and that he did prepare them and supplied them to the builders the corporation required them to be supplied to. When he had proved that he should ask the jury for their verdict for the plaintiff.

Mr. Thompson, having given evidence in support of counsel's statement, in cross-examination by Mr. Turrell, said that the reason he was entitled to debit the charge against the corporation was because Mr. D'Oyley told him the work was done for them. He said the work was to be charged against both the corporation and Sir William Earle.

Sir William Earle, examined by Mr. Lowe, said he was a clerk in Holy Orders. He remembered an interview in October, at which Mr. D'Oyley and Mr. Allbutt were present. He did not remember the date of that interview. At that interview the subject of quantities was discussed. He did not himself think the quantities necessary, but witness said that if they were necessary he knew a gentleman who would do the work on the same terms as any professional gentleman, and that if the thing did not go through there would be no fees at all. Mr. Allbutt said he knew another gentleman who would do it. He did not know the name of the person he mentioned. He understood it was to be on the same terms—"no cure, no pay"; that was the whole arrangement right through. He did not suggest that any such thing was said to Mr. Thompson. Mr. D'Oyley said he knew another gentleman, but he could not say whether he mentioned Mr. Thompson or not. He could not swear that any definite instructions were given by Mr. Allbutt or himself.

Cross-examined by Mr. Turrell, the construction of the flats was his own idea. His idea was to house some of their people who were scattered. The only interest the Corporation had in the scheme was that, in consideration of 2½ per cent. when the flats were erected, they were to find 20,000*l.*, and that sum was to be got either by the corporation or somebody else on payment of 2½ per cent. on the 20,000*l.*, and any profit beyond that 20,000*l.* was to be his. What he estimated was that when the scheme went through the property would be worth 35,000*l.* As a matter of fact, the claim fell through because the Duke of Bedford's agent refused to grant the lease. His contention was that he gave no authority to any one except on the terms of "no cure no pay." Rightly or wrongly, he gave Mr. D'Oyley no authority to engage plaintiff, except on the system of "no cure, no pay." He never had any communication with Mr. Thompson at all.

This being the plaintiff's case,

Mr. Turrell formally took the objection that there was no evidence of authority on the part of Mr. D'Oyley to pledge the defendants' credit. What he meant, he said, by that was that an architect had no implied authority to pledge a client's credit.

His lordship asked if there was any authority for such a proposition?

Mr. Turrell thought not. The learned counsel then proceeded to open the case for the corporation. As he understood it, except for one piece of evidence there would be no case for him to answer. That piece of evidence was that under the judge's ruling a person employed as an architect would have authority to employ on behalf of his principal a quantity surveyor. He would assume that he had authority, and then the question was, did the architect do it? The only piece of evidence to show he did was the direct evidence of Mr. Thompson that he was told that he was employed on behalf of the corporation and on behalf of Sir William Earle. He should put Mr. D'Oyley in the box, and he would tell them what his position was, and that he was the architect employed on behalf of Sir William Earle and only on behalf of him. In order to determine that question it was necessary for the jury to look at the position of the parties. Sir William Earle had the idea that he would build the flats, that there would be a large profit, and that he would take every penny of that profit. Mr. Lowe had said that this was a joint adventure between Mr. D'Oyley, the corporation, and Sir William Earle. He (counsel) said it was nothing of the kind. Whose adventure was it? Who was going to take the profit if there was any? Sir William Earle. All the corporation had to do was to find the 20,000*l.*, and for which they were to receive 2½ per cent. commission. There their liability began and ended. The story told by the plaintiff was most improbable. It was for the plaintiff to make out his case and to make out such a case as was supported by contemporaneous documents.

Mr. D'Oyley, examined, said he was an architect, and was employed by Sir William Earle to get out the plans for the proposed buildings. An express authority was given him by Sir William Earle to employ a quantity surveyor. That was at the meeting in October at the corporation's offices. Mr. Allbutt told Sir William Earle that the matter could not be gone on with any further unless quantities were taken out. Nothing was said about "no cure, no pay." He afterwards saw Mr. Thompson and instructed him to take out the quantities for Sir William Earle.

Cross-examined by Mr. Ashton Cross, Mr. Thompson was a stranger to him before this. It was a common thing for an architect to instruct a quantity surveyor. Sir William Earle was introduced to him as a man of considerable property. He had no entry to show that he employed plaintiff on behalf of Sir William Earle. He had always looked on Sir William Earle as his client. He had only looked to Sir William for his fees.

Mr. Henry Allbutt, examined, said he was managing director of the defendant corporation. It was Sir William Earle who had instructed Mr. D'Oyley to employ the plaintiff in getting out the quantities. All the corporation had to do was to find the 20,000*l.* They had found the money, but the transaction fell through because the lease could not be obtained.

This being the defendants' case, learned counsel addressed the jury on behalf of their respective clients, and after his lordship had summed up the jury returned a verdict for the corporation, and judgment was entered accordingly.

CLAIM FOR COMPENSATION FOR BRICKLAYER'S LABOURER'S DEATH.

THE case of Groom *v.* the Stanton Ironworks Company, Ltd., came before the Court of Appeal, consisting of the Master of the Rolls and Lord Justices Moulton and Farwell on the 6th inst., on the defendants' application for security for the costs of the plaintiff's appeal.

Counsel, in support of the application, said the facts of the case were these. The plaintiff was the widow of a man named J. F. Groom, a bricklayer's labourer, who was killed while in the service of the defendants. The widow then started the action against the defendants for compensation under Lord Campbell's Act and the Employers' Liability Act, and the judge at the trial found in favour of the defendants. The plaintiff then exercised the option she had and applied to the judge to assess compensation under the Workmen's Compensation Act, 1897, but he refused to do so on the ground that the deceased man had not been employed "on, in, or about a factory" within the meaning of that Act. That was the only ground on which the learned judge gave judgment for the defendants and refused to grant a certificate under the Workmen's Compensation Act. As far as he could see, the defendants were not liable. The whole question in the case was whether the accident occurred "on, in, or about a factory" within the meaning of the Act. It appeared that the only ground for saying that the accident did occur "on, in, or about a factory" was this: The defendants owned a certain estate which had a factory on one portion of it, and labourers' cottages on the other, and the deceased man lived in one of these cottages; and the Great Northern Railway Company ran their line between the two portions of the estate. The place where the accident occurred was quite 200 yds. away from the factory. He submitted that the assumption was that the learned judge had come to a proper decision.

After hearing Mr. W. H. Stephenson on behalf of the plaintiff in opposition to the application their lordships directed that the plaintiff should give security in the sum of 10*l.* within a fortnight, the costs of the application to be dealt with on the hearing of the appeal.

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, —; Contracts, iv. vi. viii. x.; Public Appointments, xvii.; Auction Sales, xxvi.

Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bonâ-fide tender unless stated to the contrary.

Competition.

AUGUST 31.—**Barnsley.**—SCHOOL.—The Governors of the High School for Girls, Barnsley, invite applications from qualified practising architects desiring to compete for the designing and erection of a new high school for girls, to accommodate 400 pupils, on a site in Huddersfield-road, Barnsley. The Governors propose to select from the applicants a limited number of competitors, who will be asked to submit plans. In connexion with such competition three premiums of 100*l*., 50*l*., and 20*l*. will be offered. The plans will be adjudicated upon by a fully-qualified non-competing architect acting as assessor. Applications, which must be sent in before August 31, to Mr. Wm. P. Donald, Clerk to the Governors, Education Office, Barnsley, should state (1) name of competitor; (2) business address; (3) particulars of secondary schools built from applicants' designs; (4) success of applicant in similar competitions; (5) the amount of commission (stated as a percentage on the amount for which the contracts are let) the competitor will be prepared to accept in the event of his plans being accepted; (6) the further sum required for taking off and supplying bills of quantities, also stated as a percentage; (7) any other information which the applicant may think it advisable to submit.

Contracts.

BUILDING.

AUGUST 14.—**Bothalhaugh.**—ENTRANCE LODGE.—The erection of an entrance lodge at Bothalhaugh, near Morpeth, for the Hon. and Rev. W. C. Ellis. Plans and specifications at office of Mr. L. A. Loades, architect, Market-place, Morpeth. Tenders, sealed and endorsed, to be delivered not later than August 14.

AUGUST 14.—**Halesworth.**—ALTERING FRONT.—Altering front of dwelling-house at Halesworth, supplying and fixing new plate-glass shop front (about 40 ft. long), including inside and outside self-acting spring blinds, etc. Plans and specifications can be seen by applying to Messrs. Roe & Co., drapers, Halesworth, until August 14, on which day, before 6 p.m., tenders must be delivered to Messrs. Roe & Co. Mr. Arthur Pells, F.S.I., architect, Beccles.

AUGUST 14.—**Halifax.**—CARETAKER'S HOUSE.—Halifax Health Committee invite tenders for the execution of the mason's, excavator's and bricklayer's, carpenter's and joiner's, slater's and plasterer's, plumber's and glazier's, and painter's work required in the erection of a caretaker's house at the small-pox hospital. Plans and specifications may be seen, and forms of tender obtained, on application to Mr. James Lord, M.Inst.C.E., Borough Engineer, Town Hall, Halifax, upon payment of the sum of 1*l*. Tenders, properly endorsed, must be sent to Mr. Keighley Walton, Town Clerk, not later than 12 o'clock noon on August 14.

AUGUST 14.—**Idle.**—CONVENIENCES.—Additions to, and alterations of, conveniences, etc., at the Springfield Mills, Idle, for the Idle Worsted Mill Company, Ltd. Plans, etc., may be seen, and quantities obtained, at office of Mr. James T. Cordingley, architect, Boothroyd, Town-lane, Idle, Bradford. Tenders to be sent to Mr. Edwin Thornton, Secretary, Marlborough-road, Idle, not later than 1 o'clock on August 14.

AUGUST 14-23.—**Mablethorpe.**—SCHOOL ADDITIONS.—Lindsey C.C. Education Committee invite tenders for additions to the Council school at Mablethorpe. Bills of quantities and form of tender may be had on application to Messrs. Scorer & Gamble, architects, Bank-street-chambers, Lincoln, on or before August 14, and on payment to them of 1*l*. 1s. The drawings and conditions of contract may be inspected at the offices of the architects. Tenders must be delivered to the Secretary, Mr. S. Maudson Grant, 256, High-street, Lincoln, in the envelope provided for that purpose, before 10 a.m., August 23.

AUGUST 14.—**Royston.**—INSTITUTE, ETC.—Building an institute and gymnasium at Royston. Plans and specifications can be inspected on application to the Engineer, New Monckton Collieries, near Barnsley. Tenders to be in on or before August 14.

AUGUST 14.—**Strathaven.**—ADDITIONS.—Additions and repairs at Avonbank Farm (about one mile from Strathaven). Separate slump offers wanted for (1) mason work, (2) joiner work, (3) slater and plaster works, (4) plumber work. Plan and specification can be seen at the farm; and offers to be lodged with Mr. John Boyes, Woodhead Farm, Kirkmuirhill, not later than August 14.

AUGUST 15.—**Belfast.**—GATE LODGE, ETC.—Tenders, addressed to Mr. H. Williams, Secretary, Office of Public Works, Dublin, for the erection and completion of a gate lodge and tower at Queen's College, Belfast, will be received up to 10 o'clock a.m. on August 15. The plans and specification can be seen at this office, and at the office of Mr. Ferguson, 2, Wellington-place, Belfast, by whom forms of tender and bills of quantities will be supplied on deposit of 1*l*.

AUGUST 15.—**Briton Ferry.**—CHAPEL ADDITIONS.—Additions and alterations to the English Baptist chapel, Briton Ferry. Plans and specification may be inspected with Mr. A. H. Thomas, 45, Neath-road, Neath, and at the offices of the architect, from whom bills of quantities may be obtained. Sealed tenders to be sent to Mr. Thomas on or before August 15. Mr. W. Beddoe Rees, architect, 3, Dumfries-place, Cardiff.

* AUGUST 15.—**Dronfield.**—EXTENSION OF GOODS SHED.—The Directors of the Midland Railway Company invite tenders for the above. Plans and specifications may be seen, and quantities and particulars obtained, on application at the Engineer's Office, Derby Station. Sealed tenders to be forwarded by post to the Secretary of the Way and Works Committee, Midland Railway, Derby, not later than 9 a.m. on August 15.

AUGUST 15.—**Halifax.**—WAREHOUSE.—For mason's, concretor's and steel erector's works required in connexion with the enlargement of warehouse at Stansfeld Mills, Triangle, for Messrs. William Morris & Sons, Ltd. Plans and specifications may be seen, and bills of quantities obtained, at offices of Mr. W. Clement Williams, architect, 29, Southgate, Halifax, from August 8 until August 15, on which last-named date sealed tenders are to be delivered not later than 12 o'clock noon, endorsed "Tender for Enlarging Warehouse."

AUGUST 16.—**Dalton-le-Dale.**—CHURCH RESTORATION.—The restoration of the parish church at Dalton-le-Dale, near Sunderland. Plans and specification inspected on application at "The Glebe House, Dalton-le-Dale," from August 8 to August 16, when tenders are to be sent to Mr. C. Hodgson Fowler, F.S.A., architect, The College, Durham. Quantities, on written promise to submit a sole tender, may be obtained of Mr. W. Morton, quantity surveyor, 27, John-street, Sunderland.

AUGUST 17.—**Bruff.**—RESIDENCE, ETC.—Kilmallock Guardians will at their meeting, to be held on August 17, consider tenders for the erection of dispensary residence, out offices, etc., at Bruff, according to plan and specification, which can be seen at office of Mr. P. J. Coll, Clerk of Union, Kilmallock Union, Clerk's Office, on any day (Sunday or Board Days excepted), between the hours of 10 a.m. and 4 p.m. Forms of tender can be had on application to Clerk. Sealed tenders, stating the names of two solvent sureties willing to join in a bond of 1,000*l*. for the due performance of the contract, to be addressed to the presiding Chairman, and endorsed "Tender for Erection of Dispensary residence."

AUGUST 17.—**Treorchy.**—ADDITIONS TO PREMISES.—Additions to No. 122, Bute-street, Treorchy, for Mr. Lewis Lewis, butcher, with whom plans and specification may be seen at 114, Bute-street, Treorchy. Sealed tenders to be sent to the proprietor on or before noon on August 17. Mr. W. D. Morgan, architect, Pentre.

AUGUST 18.—**Belfast.**—EXTENSION TO PREMISES.—Building extensions to the premises of Messrs. R. Watson & Co., Ltd., of Belfast, Donegall-street, according to the plans, specification, and conditions of contract, to be seen in office of Mr. William J. Fennell, M.R.I.A., architect, 2, Wellington-place, Belfast. Bills of quantities can be obtained from Messrs. M'Carthy & Brookes, surveyors, Scottish Provident-buildings. Tenders to be sent to architect on or before August 18.

AUGUST 18.—**Halifax.**—ADDITIONS TO CLUB.—For the masons, carpenters and joiners, plumbers and glaziers, plasterers and slaters, heating engineers, ventilating engineers, and painters' work in the erection of additions to Booth Town Liberal Club, Halifax. Plans and specifications will lay for inspection, and quantities may be obtained, at offices of Messrs. Chas. F. L. Horsfall & Son, architects, Lord-street Chambers, Halifax, from August 13 to August 18, on which last-named date sealed tenders must be delivered not later than 12 o'clock.

AUGUST 18.—**Milton.**—SCHOOL.—The Somerset County Education Committee invite tenders for the works required for the erection and completion of a new infants' school at Milton, Weston-super-Mare. Drawings, specification, and conditions of contract can be seen, and copies of bill of quantities obtained, at the offices of the architects, Messrs. Hans Price & Wm. Jane, Waterloo-street, Weston-super-Mare. Sealed tenders, endorsed "Milton Infants' School," must be delivered at the County Education Office, Weston-super-Mare, not later than 12 noon on August 18.

AUGUST 18.—**Sudbury.**—HOSPITAL WORKS.—The Committee of Management of St. Leonard's Hospital, Sudbury, invite tenders for alterations and additions to the hospital. Drawings, specification, and conditions may be seen at the office of the architect, Mr. Alfred Howard Cornard-road, Sudbury, from whom further information can be obtained. Tenders, which are to be sent in by August 18, should be sealed, and endorsed "Tender for Alterations and Additions to St. Leonard's Hospital," and addressed to Mr. F. G. Steed, Secretary of the St. Leonard's Hospital, Sudbury.

AUGUST 20.—**Dublin.**—MOTOR-CAR SHED WORKS.—Great Northern Railway Company (Ireland) Directors invite tenders for the following works in connexion with the new motor-car shed at Amiens-street Terminus, Dublin:—Contract No. 1, three timber smoke troughs, each 126 ft. long; contract No. 2, slating of roof. Parties wishing to tender for the works may see the respective drawings and specifications at the office of Mr. W. H. Mills, Engineer-in-Chief, Amiens-street, Dublin; or copies of them at the office of the district engineer, Belfast; and can obtain at the said offices forms of tender for each contract on payment of 1s. (not returnable) each. Tenders, made out on the forms supplied by the Company, and endorsed, respectively, "Tender for Smoke Troughs," and "Tender for Salting," should be delivered to Mr. T. Morrison, Secretary, Secretary's Office, Amiens-street Terminus, Dublin, not later than 10 a.m. on August 20.

AUGUST 20.—**Haslemere.**—ENGINE-HOUSE, ETC.—Hambledon R.D.C. invite tenders for the erection of an engine-house and pair of cottages at the pumping-station on Blackdown, near Haslemere. The specification and drawings can be seen, and schedules of quantities and forms of tender can be obtained, on and after August 13, at the offices of Messrs. R. B. Grantham & Son, 23, Northumberland-avenue, London, W.C., on payment of a deposit of 3*l*. 3s. Sealed tenders, which must be on the prescribed form, and endorsed "Haslemere Water Works," must be sent to Mr. Ferdinand Smallpeice, Clerk to the Council, 138, High-street, Guildford, on or before August 20.

AUGUST 20.—**Rhymney.**—VILLA RESIDENCE.—Villa residence at Rhymney for Councillor John Edwards. Drawings and specification may be seen, and further particulars obtained, from Messrs. James & Morgan, FF.R.I.B.A., architects, Charles-street-chambers, Cardiff. Tenders, sealed and endorsed, to be delivered to Councillor Edwards, not later than August 20.

AUGUST 21.—**Bangor.**—FREE LIBRARY.—Bangor General Purposes Committee invite tenders for the erection of a new free library at Bangor, North Wales. Bills of quantities may be obtained, and plans and specification may be seen, by application to Messrs. Dixon & Potter, architects, 66, King-street, Manchester. A deposit of 2*l*. will be required from each applicant for a copy of the quantities. Sealed tenders, endorsed "Free Library," to be sent, not later than August 21, to the Chairman of the General Purposes Committee, Health Department, Municipal Offices, Bangor.

AUGUST 22.—**London.**—ALTERATIONS AT WORKHOUSE.—The Guardians of the Poor of the Parish of St. Leonard, Shoreditch, invite tenders for alterations at their additional workhouse, Hazelville-road, Hornsey Rise, N., lately known as the "Alexandra Orphanage." The specifications can be seen, and all information obtained, at the office of Mr. F. J. Smith, F.R.I.B.A., Parliament-mansions, Victoria-street, S.W., upon payment of 5*l*. Sealed tenders, upon the forms supplied, must be delivered to the Guardians, at their meeting to be held at the Board-room, 204, Hoxton-street, N., on August 22 at 5 p.m.

AUGUST 23.—**Sutton-on-Sea.**—LIFE-BOAT HOUSE.—The Hon. Secretary of the Royal National Life-boat Institution, Sutton-on-Sea Branch, invite tenders for the demolition of the existing life-boat house, adjoining the Promenade at Sutton-on-Sea, and the construction of an enlarged boathouse on the same site. Contract drawings, terms and conditions of contract, and specification may be seen on application to Mr. B. Simons, Hon. Secretary, Sutton-on-Sea; or at the office of the Engineer and Architect to the Royal National Life-boat Institution, Mr. W. T. Douglass, 15, Victoria-street, Westminster, London, S.W. Copies of the form of tender, conditions of contract, and bills of quantities, may be obtained on application to the Engineer and architect upon payment of a deposit of 1*l*. 1s. Copies of certain of the plans may be obtained from the Engineer and Architect on payment of 2s. 6d., which sum is non-returnable. Sealed tenders, which will only be received on the form supplied, endorsed "Tender for the Reconstruction of Life-boat Station, Sutton-on-Sea," to be delivered to the Hon. Secretary, at Willoughby, Alford, Lincolnshire, at or before 10 a.m. on August 23.

* AUGUST 24.—**Greenwich.**—NEW SORTING OFFICE.—The Commissioners of H.M. Works and Public Buildings invite tenders for erection of new sorting office at Greenwich. Drawing, specification, conditions, and form of contract may be seen on application to Mr. J. Wager, H.M. Office of Works, Storey's-gate, S.W. Bills of quantities and forms of tender are obtainable on deposit of 1*l*. 1s. Tenders, addressed to the Secretary, as above, and endorsed "Tender for Greenwich Sorting Office," to be delivered before 12 o'clock noon on August 24.

AUGUST 25.—**Newport.**—TECHNICAL INSTITUTE ADDITIONS.—Isle of Wight County Education Committee invite tenders for additions and alterations at the Technical Institute, Newport. Plans and specifications may be seen at the County Education Offices, Newport, I.W.; or at the office of the architect, 5, St. Thomas's-street, Ryde, I.W., where all information may be obtained. Sealed tenders, endorsed "Technical Institute," must reach Mr. F. G. Flux, Secretary, County Education Offices, Newport, I.W., on or before August 25.

* SEPTEMBER 4.—**London.**—WORKS AND REPAIRS.—The Commissioners of H.M. Works and Public

Buildings invite tenders for ordinary works and repairs to buildings, etc., in their charge in the London district for three and a half years from October 1, 1906. The printed schedule, with form of tender, may be obtained at H.M. Office of Works, Storey's Gate, S.W., between 11 and 5, on payment of 1*l*. Tenders to be delivered before 12 noon, September 4, addressed to the Secretary, H.M. Office of Works, Storey's Gate, S.W., and endorsed, "Tender for Ordinary Works and Repairs, London."

* SEPTEMBER 5. — **Manchester.** — ADDITIONS TO SCHOOL.—Tenders are invited for alterations and additions to the Abbott-street Municipal School, Rochdale-road, Manchester. Plans may be seen, and copy of bills of quantities, etc., obtained, on or after September 4, at the Education Offices, Deansgate, Manchester, on deposit of 2*l*. 2s. Tenders to be delivered not later than September 5.

* SEPTEMBER 5. — **Manchester.**—SCHOOL. — Tenders are invited for the erection of a municipal school in Domett-street, Blackley, Manchester. Plans may be seen, and bills of quantities, etc., obtained, on or after September 1, on deposit of 2*l*. 2s., at the Education Offices, Deansgate, Manchester. Tenders to be delivered not later than September 5.

SEPTEMBER 12.—**Merthyr Tydfil.**—CHAPEL ADDITIONS.—Additions and improvements to Bethesda Congregational Chapel, Merthyr Tydfil. The plans and specifications can be seen with Mr. Rees Jones, grocer, Bethesda-street. The tenders to be sent, sealed and endorsed, to Mr. John Thomas, 90, Brecon-road, Merthyr Tydfil, not later than September 12. Messrs. Owen Morris Roberts, architects and surveyors, Portmadoc.

* SEPTEMBER 27. — **Whitechapel.** — ALTERATIONS.—The Council of the Metropolitan Borough of Stepney invite tenders for certain additions and alterations in the building at their electricity works, Osborn-street, Whitechapel, E. The drawings may be seen, and copies of the stipulations, specifications, schedule, and form of tender may be obtained of the Borough Engineer, Mr. M. W. Jameson, at 15, Gt. Alie-street, Whitechapel, E., on and after August 13, between 10 and 12, on deposit of 5*l*. Tenders, endorsed "Tender for Additions to Electricity Buildings," should be sent to Mr. G. W. Clarke, Town Clerk, 15, Gt. Alie-street, Whitechapel, E., in the envelopes supplied, before 12 noon, September 27.

NO DATE.—**Lacca.**—REPAIR OF CHURCH.—The Churchwardens and Select Vestry of Offerlane Parish invite tenders for the repair of Lacca Church, in accordance with specification, copies of which can be obtained from the Rev. F. J. Hartley, Offerlane Vicarage, Mountrath, Queen's County.

* NO DATE.—**Middlesex.**—Tenders are invited for erection of new stables, etc., at Kensington Palace Barracks. Drawings and specifications can be seen and forms of tender obtained (on payment of ten shillings), from August 13 to 16 inclusive, of Mr. Harry B. Measures, Director of Barrack Construction, War Office Atterbury-street, Grosvenor-road, S.W.

NO DATE.—**Waddington.**—ADDITIONS TO CHURCH.—Additions to the Wesleyan Church and School, Waddington, near Clitheroe. Quantities from architects on depositing 1*l*. 1s. Building in stone with dressings. Apply Messrs. Potts, Son, & Hennings, architects, St. George's road, Bolton.

ENGINEERING, IRON, AND STEEL.

AUGUST 13.—**Dover.**—BOILER.—Dover Town Council invite tenders for constructing, delivering, and setting one Lancashire boiler, including the removal of two of the existing boilers, at the Waterworks, Castle Hill, Dover. The specification and form of tender may be obtained on payment of 2*l*. 2s., and the drawing and general conditions of contract inspected at the office of the Borough Engineer, Mr. W. C. Hawke, C.E., Maison Dieu House, Biggin-street, Dover. Tenders, endorsed "Tender for Boiler," to be sent to Sir Wollaston Knocker, Town Clerk, Town Clerk's Office, Castle Hill House, Dover, on or before August 13.

AUGUST 15.—**London.**—SPRINGS.—The East Indian Railway Company invite tenders for the supply and delivery of spiral and volute springs, as per specification, to be seen at the Company's offices. Tenders are to be sent to Mr. C. W. Young, Secretary, Nicholas-lane, London, E.C., marked "Tender for Spiral, etc., Springs," not later than 12 o'clock noon on August 15. For each specification a fee of 1*l*. 1s. is charged, which cannot under any circumstances be returned.

AUGUST 15.—**Portsmouth.**—URINAL, ETC.—Portsmouth Borough Council invite tenders for constructing, completing, and maintaining in thorough repair for six calendar months from the completion thereof, the following works:—A six-stall urinal and two water-closets at the North End Recreation Ground, in the Borough of Portsmouth. The plan and specification may be seen, and a form of tender may be obtained, at the offices of the Borough Engineer, at the Town Hall. The form of tender is to be completely filled in and sent under cover to Mr. Alexander Hellard, Town Clerk, Town Hall, Portsmouth, not later than 10 a.m. on August 15.

AUGUST 17.—**Dorchester.**—BOILER.—For providing and fixing one of Keith's Challenge boilers at the Shire Hall, Dorchester. Plan and specification to be seen at the County Surveyor's office, Dorchester; and tenders, endorsed "Boiler Tender," to be sent in to County Surveyor, Dorchester, on or before August 17.

AUGUST 24.—**Aberdeen.**—JETTY.—The Aberdeen Harbour Commissioners invite tenders for the construction of a timber jetty, about 435 ft. long and 30 ft. wide, and relative works, on the south side of Albert Basin, within the Port of Aberdeen. The contract drawings may be seen at the offices of Mr. R. Gordon Nicol, Engineer, Harbour Engineer's Office, Aberdeen, between the hours of 10 a.m. and 4 p.m., and copies of the specification, schedule of quantities, and general plan and sections obtained, on payment of 2*l*. 2s. Tenders, endorsed "Tender for Timber Jetty, Albert Basin," are to be lodged with the Engineer not later than 12 o'clock noon on August 24.

AUGUST 24. — **Hopetoun.** — RAILWAY. — Young's Paraffin Light and Mineral Oil Company, Ltd., invite tenders for the construction of fully a mile of private railway, with sidings leading to No. 41 Mine, Hopetoun. Also, for construction of haulage way to Spent Shale Bing, at Hopetoun Works. Drawings may be seen, and specifications and schedules obtained, from Messrs. D. & G. R. Rankine, civil and mining engineers, 238, West George-street, Glasgow. The works will be pointed out on August 17, leaving Uphall Station in conveyance provided by the Company after arrival of trains from the East and West, due shortly after 11 o'clock. Offers to be lodged with Mr. John Fyfe, Managing Director, 7, West George-street, Glasgow, on or before August 24.

SEPTEMBER 3.—**Bristol.**—GRAIN CONVEYING AND ELEVATING MACHINERY.—Bristol Docks Committee invite tenders for the construction, delivery, erecting in place, testing, and maintenance for twelve months after completion, of grain conveying and elevating machinery at the Royal Edward Dock, now in course of construction at Avonmouth. The contract includes grain conveying bands, grain elevators, automatic weighing machines, steel shoots, and electric motors for driving the machinery. Copies of the specification, form of tender, form of contract, and copy of the contract drawings, can be obtained from Mr. W. W. Squire, Engineer, Engineer's Office, Cumberland-road, Bristol, on production of a receipt from the Secretary of the Docks Committee, showing that 5*l*. has been paid as deposit. Tenders must be enclosed in a sealed envelope, endorsed "Tender for Grain Conveying and Elevating Machinery, Royal Edward Dock," and addressed to the Secretary of the Docks Committee, 19, Queen-square, Bristol, and must be delivered to him before 10 a.m. on September 3.

NO DATE.—**Watford.**—STAIRCASES.—Watford Guardians invite tenders for the ironfounders' and builders' work required in the erection of iron emergency staircases at the Union Workhouse, Watford. Drawings and specification can be seen at the office of Mr. C. P. Avres, Burvale, Watford, architect, from whom form of tender and full particulars can be obtained.

MISCELLANEOUS.

AUGUST 13.—**Greenside.**—FITTINGS, ETC.—Fittings and fixtures of the Greenside Branch of the West Wylam and Prudhoe Co-operative Society, Ltd. Plans and specifications can be seen at the Society's office at Prudhoe. Sealed tenders to be sent in not later than August 13.

AUGUST 13.—**Manchester.**—TEAM LABOUR.—Manchester Corporation Tramways Committee invite tenders for the supply of team labour required by the Department during the ensuing twelve months. Forms of tender may be obtained on application to Mr. J. M. M'Elroy, General Manager, Tramways Department, 55, Piccadilly Manchester. Tenders are to be addressed to the Chairman of the Tramways Committee, 55, Piccadilly, Manchester, endorsed "Tender for Team Labour," and must be received not later than 5 p.m. on August 13.

AUGUST 13.—**Wesham.**—GAS PENDANTS, ETC.—Plain gas pendants and brackets for the new workhouse at Wesham. Samples, with prices attached, to be delivered at the new workhouse not later than August 13. Further particulars may be obtained from the architects, Messrs. Haywood & Harrison, Accrington. Mr. Fred. H. Brown, Clerk to the Fylde Guardians, Union Offices, Kirkham.

AUGUST 15.—**London.**—TOOLS.—The East Indian Railway Company invite tenders for the supply and delivery of miscellaneous tools, as per specification to be seen at the company's offices. Tenders are to be sent to Mr. C. W. Young, Secretary, Nicholas-lane, London, E.C., marked "Tender for Miscellaneous Tools," not later than 12 o'clock noon on August 15. The company reserves to itself the right to divide the order. For each specification a fee of 1*l*. 1s. is charged, which cannot, under any circumstances, be returned.

AUGUST 16.—**Salford.**—PURIFYING MATERIAL.—Salford Gas Committee invite tenders for the supply of 750 tons of oxide of iron purifying material. Full particulars may be obtained on application to Mr. William W. Woodward, Engineer, Gas Offices, Bloom-street, Salford. Sealed tenders, endorsed "Tender for Oxide," addressed to the Chairman of the Gas Committee, Town Hall, Salford, to be delivered to Mr. L. C. Evans Town Clerk, Town Hall, Salford, not later than 3 p.m. on August 16.

AUGUST 16.—**Thorner.**—FENCING.—The Wetherby R.D.C. invites tenders for the supply of 136 lin. yds. best creosoted fencing, for their sewage works, Thorner. Full particulars may be had from the caretaker of the works. Sealed tenders, endorsed "Fencing," to be received at office of Mr. E. H. Coates, Clerk to the said Council, Wetherby, not later than 10 a.m. on August 16.

AUGUST 17.—**Lurgan.**—TELEPHONES, ETC.—Lurgan Town Council invite tenders for the erection of about five miles of telephone; also water-level recorder and transmitting instrument, in accordance with specification and plans prepared by their Consulting Engineer, Mr. Henry Harris, 30, Parliament-street, Dublin, and which can be seen at office of Mr. F. W. Pollock, Clerk to Council, Town Hall, Lurgan, any week day between 10 a.m. and 4 p.m., Saturday, 10 to 1. Tenders to be submitted before August 17 next, on forms which can be had gratis on application, and marked "Telephone Tender."

AUGUST 23.—**Manchester.**—OIL.—Manchester Corporation Gas Committee invite tenders for the supply of a cargo, by December 20 next, of 3,000 to 3,500 tons of oil for the manufacture of carburetted water-gas. Description of the oil, conditions of contract, and further particulars may be obtained on application (in writing only) to Mr. Charles Nickson, Superintendent of the Gas Department. Sealed tenders and samples, addressed to the Chairman of the Gas Committee, and endorsed "Tender for Gas Oil," must be delivered at the office of the Superintendent of the Gas Department, Town Hall, Manchester, on or before August 23.

PAINTING, etc.

AUGUST 14.—**Hull.**—PAINTING.—Hull Charterhouse Trustees invite tenders for painting the various properties belonging to this charity. Copies of the specification can be obtained at office of Mr. John Watson, Surveyor to the Charterhouse Trustees, Cogan-chambers, Hull, and tenders, endorsed "Tender for Painting," to be sent in on or before August 14.

AUGUST 17.—**Bodham.**—PAINTING, ETC.—Norfolk Education Committee invite tenders for painting and general repairs at Bodham School. Specifications at the offices of Mr. E. J. Tench, architect, Upper King-street, Norwich. Tenders must be delivered by 12 noon on August 17, addressed to "The Secretary, Norfolk Education Committee, 57, London-street, Norwich," and marked "Tender for Bodham School."

AUGUST 17.—**Nottingham.**—PAINTING.—Nottingham Castle Museum and School of Art Committee invite tenders for internal cleaning and painting at the Castle Museum. Specification, bill of quantities, and form of tender may be obtained from Mr. Frank B. Lewis, City Architect, Guildhall, on payment of a deposit of 1*l*. 1s. Sealed tenders, properly endorsed, to be delivered at office of Mr. Samuel G. Johnson, Town Clerk, the Guildhall, before 10 a.m. on August 17.

AUGUST 20.—**Gosport.**—PAINTING, ETC.—Gosport and Alverstoke U.D.C. invite tenders for the exterior painting, etc., at the Council Offices, Free Library, Fire Station, Air Compressing Station, Cemetery, and Park. Specifications may be seen, and further particulars, with forms of tender, obtained at the surveyor's office. Tenders, endorsed "Tender for Painting," to be delivered to Mr. E. Talbot Palmer, Clerk to the Council, Gosport, not later than noon on August 20.

ROADS, SANITARY, AND WATER WORKS.

AUGUST 13.—**Sacriston.**—RENOVATION OF PREMISES.—The Committee of Sacriston Literary Institute, Sacriston, co. Durham, invite tenders for the renovation of their premises. Drawings, specifications, and conditions of contract may be seen, and forms of tender obtained, at the office of Mr. Geo. Thos. Wilson, architect, 22, Durham-road, Blackhill, co. Durham. Tenders to be sent, endorsed "Renovation Literary Institute, Sacriston," to Mr. R. Bulmer, Secretary, Sacriston, co. Durham, on or before August 13.

AUGUST 14.—**Leeds.**—PAVING, ETC.—Leeds Highways Committee invite tenders for the paving and flagging of the following streets:—Cross Flatts-crescent, Cross Flatts-terrace, Back Cross Flatts-place, Cross Flatts-place, Cross Flatts-parade, Cross Flatts-grove (top portion), Cross Flatts-drive, Westovermount, and Back Roman-place. Also for the making of asphalt footpaths and granite macadam roadway in Roman-view, and for the making of asphalt footpaths and tar-macadam roadways in Roman-grove, Roman-place, and Lidgett-walk. Drawings may be seen at the City Engineer's Office, Municipal-buildings. Forms of tender, and bills of quantities, may be obtained, and copies of the documents forming the contract inspected, on application at the Highways Office, 156, Kirkstall-road. Sealed tenders, endorsed "Tender for Private Street Works," and addressed to the Highways Commiteee, must be delivered at the Town Clerk's Office, Town Hall, Leeds, not later than 10 a.m. on August 14.

AUGUST 15.—**Herne Bay.**—ROAD WORKS.—Herne Bay U.D.C. invite tenders for the levelling, paving, sewering, etc., of the street extending from Lane End to Hampton Pier, and known as to its several portions as the Western Esplanade and St. George's Parade. Plans, sections, and specifications can be seen, and forms of tender obtained, on application to Mr. F. W. J. Palmer, C.E., Surveyor to the Council, Town Hall, Herne Bay. Sealed tenders, endorsed "Tender for Making-up Marine Drive (Western Portion)," to be addressed to Mr. Joseph Jubb, Clerk to the Council, Clerk's Office, Town Hall, Herne Bay, and delivered not later than 12 o'clock noon on August 15.

AUGUST 15.—**Inverkeithing.**—SEWER PIPE.—Inverkeithing Town Council invite offers for laying about 200 yds. of 9-in. metal sewer pipe at Inverkeithing Bay to west of Paper Mill. Plans and sections may be seen in the hands of Mr. James C. Sim, architect, Inverkeithing, from whom schedules can be obtained. Offers to be lodged with Mr. John R. Menzies, Town Clerk, Inverkeithing, not later than August 15.

AUGUST 15.—**Limehurst.**—SEWERAGE WORKS.—Limehurst R.D.C. invite tenders for providing and laying about 237 lin. yds. earthenware pipe sewer, 12 in. diameter; 131 lin. yds. earthenware pipe sewer, 9 in. diameter, with manholes and lampholes. Specifications and drawings may be seen, and form of tender, with quantities, obtained on application to the Council's Surveyor, Mr. H. H. Turner, 250, Oldham-road, Waterloo, near Ashton-under-Lyne. Sealed tenders, addressed to the Chairman of the Council, and endorsed "Tender for Sewerage Works, Township of Waterloo," to be sent to the Clerk, Mr. J. Taylor, solicitor, 113, Old-street, Ashton-under-Lyne, on or before August 15.

AUGUST 16.—**Morley.**—SEWAGE TANKS.—The construction of concrete sewage tanks and filter beds, etc., at Springfield Mills, Morley. The plans and specifications may be seen, and bills of quantities obtained, at offices of Messrs. Kirk & Sons, architects and surveyors, Dewsbury, from August 9 to August 16, on which latter day tenders are to be delivered before 3 o'clock p.m.

AUGUST 17.—**Gillingham.**—ROAD WORKS.—Laying about 400 yds. super. of tar material footway and rebuilding wall on south side of High-street, Gillingham, Dorset. Specifications, etc., may be seen at Police-station, Gillingham, and tenders to be sent to the County Surveyor, Wimborne, on or before August 17.

AUGUST 18.—**Portsoy.**—DRAINAGE.—Portsoy Town Council invite offers for the opening and refilling of about four miles of pipe track; supplying, laying, and jointing fireclay and iron pipes, from 5 in. to 16 in. in diameter; building of manholes, flushing-tanks, and other relative works. Drawings and specifications may be seen with, and schedules of quantities obtained from, Mr. James Young, Town Clerk, Portsoy; or from Mr. David Reid, civil engineer, Inverness. Sealed offers, marked "Ten-

der for Drainage Works," to be lodged with the Clerk not later than August 18.

AUGUST 20.—**Gosport.**—STREETS.—Gosport and Alverstoke U.D.C. invite tenders for making-up certain private streets known as White's Slip, Queen's-road, and Avenue-road. Specifications may be seen, and further particulars, with forms of tender, obtained, at the surveyor's office. Tenders, endorsed "Tender for Private Streets," to be delivered to Mr. E. Talbot Palmer, Clerk to the Council, Gosport, not later than noon on August 20.

AUGUST 21.—**Glaston.**—MAIN DRAINAGE.—Uppingham R.D.C. invite tenders for laying about 550 yds. of 9-in. glazed stoneware pipe sewer, with junctions, manholes, and ventilating shafts, at Glaston, for the Uppingham R.D.C. Forms of specification, with plan and section, may be seen by appointment with Mr. F. R. Chapman, A.R.S.I., sanitary surveyor, Glaston-road, Uppingham. Tenders to be sent to Mr. Oakley, Clerk, Uppingham, on or before August 21.

AUGUST 22.—**Barrow.**—STREETS.—Barrow-in-Furness Corporation invite tenders for the construction of various streets. Further particulars may be obtained, together with bills of quantities and forms of tender, upon application at the office of the Borough Engineer, Town Hall. Sealed tenders, suitably endorsed, and addressed to the "Chairman of the Health Committee," to be delivered at the Town Clerk's Office, not later than 12 o'clock noon, on August 22.

AUGUST 25.—**New Tredegar.**—ROAD.—The U.D.C. of Bedwelty invite tenders for the construction of a new road across the Landslip, near New Tredegar. Plans and specification may be seen, and forms of tender obtained, on application to the Council's surveyor, Mr. J. H. Lewis, A.M.Inst.C.E., Blackwood, Mon., upon payment of a fee of 1*l.* 1*s.* The surveyor will meet intending contractors on the site by appointment. Sealed tenders, endorsed "Tender for New Road," to be delivered to Mr. T. J. Thomas, Clerk to the Council, Bargoed, Glam., on or before August 25.

★ AUGUST 25.—**Stansted.**—EXTENSION OF SEWERS.—The Stansted R.D.C. invite tenders for the provision, laying, and jointing about 641 yds. of 9-in. stoneware sewer and about 1,254 yds. of 6-in., together with all manholes and lampholes, in accordance with plans, sections, and detailed drawings prepared by the surveyor. Plans and specifications may be seen at the Central Hall, Stansted, Essex, and further particulars obtained of Mr. E. J. Watts, surveyor, Thorley, Bishop's Stortford. Sealed tenders, endorsed "Stansted Sewer," to be delivered to Mr. A. G. Gwynn, North-street, Bishop's Stortford, before 12 noon, August 25.

AUGUST 25.—**Sturminster Newton.**—WATER-WORKS.—R.D.C. of Sturminster invite tenders for constructing works for supplying Sturminster Newton with water, and for providing the materials, comprising about 7,141 yds. of 4-in. and 4,514 yds. of 3-in. cast-iron mains, hydrants, sluice and air valves, reservoir to hold 30,000 gallons, etc. The specification and form of tender can be seen at the office of Mr. A. W. H. Creech, Sturminster Newton, from August 13 to August 21 inclusive, and the bill of quantities can be obtained of the engineer on payment of 6*s.*, which will not be returned. Sealed tenders, endorsed "Tender for Sturminster Newton Water Supply," to be sent to Mr. A. W. H. Creech, on or befort August 25. Mr. Cyrus Combes, Tisbury, Wilts, Engineer to the Council.

AUGUST 28.—**Morecambe.**—SEWERAGE WORKS.—The Morecambe Town Council invite tenders for the construction of certain intended stoneware and cast-iron pipe sewers in connexion with the sewerage works of the town of Morecambe, together with manholes, ventilators, connexions, and other works, the whole to be let in one contract. Drawings and specification may be seen at the offices of the engineers, Messrs. Beesley, Son, & Nichols, MM.Inst.C.E., of 11, Victoria-street, Westminster, S.W., where also specification, bills of quantities, and forms of tender can be obtained on deposit of 5*l.* Copies of the plans and specification may also be seen at Town Hall, Morecambe. Sealed tenders, addressed to Mr. William Tilly, Town Clerk, Town Hall, Morecambe, and endorsed "Sewerage Works, Contract No. 3," are to be delivered at Morecambe before 10 a.m. on August 28.

STONE, MATERIALS, AND STORES.

AUGUST 14.—**Heywood.**—LIME, TUBES, ETC.—Heywood Gas Committee invite tenders for the supply of lime, tubes and fittings, sulphuric acid, and also for the purchase of surplus tar. Specification and form of tender may be obtained from Mr. W. Whatmough, the Gas Manager. Sealed and endorsed tenders to be sent to Mr. Geo. G. Bouchier, Town Clerk, Municipal Buildings, Heywood, not later than August 14.

AUGUST 14.—**Portsmouth.**—STORES.—Portsmouth Corporation invite tenders for the following purposes: (1) For the supply of Purbeck paving, etc.; (2) for the supply of gravel, sand, and shingle; (3) for the supply of granite; (4) for the supply of oils and paints; (5) for the supply of brooms and brushes; (6) for the supply of castings; (7) for the supply of lime; (8) for the supply of timber; (9) for the supply of disinfectants; (10) for the supply of ironmongery; (11) for the supply of drain pipes; (12) for the supply of Portland cement; (13) for the supply of stationery; (14) for the repairs of harness used by the corporation horses; (15) for plumbing work; (16) for dredging; (17) for erecting ventilating shafts; (18) for general printing (in sections); (19) for steam coal; (20) for house coal, smiths' coal, and coke; (21) for the supply of officers' clothing. The specification and printed form of tender with regard to each of the above items may be obtained at the Town Clerk's Office, Town Hall. Sealed tenders, on the prescribed form, endorsed "Tender for ——," are to be delivered at the Town Hall not later than 10 a.m. on August 14.

AUGUST 15.—**Clacton.**—FLINTS.—Clacton U.D.C. invite tenders for the supply of 1,700 yds. of flints. Endorsed tenders, with samples, to be sent to Mr. Geo. T. Lewis, Clerk to the Council, Town Hall, Clacton-on-Sea, not later than noon on August 15 next. Specification and further particulars may be obtained upon application to Mr. A. R. Robinson, Surveyor to the Council, Town Hall, Clacton-on-Sea.

AUGUST 20.—**Pontypridd.**—STORES.—Pontypridd U.D.C. invite tenders for the supply of the following stores and materials required during the period ending June 30, 1907:—(5) Fireclay goods; (6) wrought-iron tubes and fittings; (7) lead and compo.; (8) iron, steel, barrows, etc.; (9) drysaltery and paints; (9a) oils; (10) brass fittings and sundries; (11) slot fittings; (12) meters; (13) main taps and locks; (14) steam valves, packing, etc.; (15) castings; (16) incandescent lighting materials; (17) ironmongery; (18) lamps; (19) stable requisites. Forms of tender may be obtained on application to Mr. E. H. Swain, Engineer and Manager Gas Works, Treforest. Tenders, on the prescribed form, sealed, and endorsed "Stores, No. ——," must be received by Mr. J. Colenso Jones, Clerk to the Council, Municipal buildings, Pontypridd, on or before August 20.

AUGUST 31.—**Edinburgh.**—SAND, PIPES, AND SPECIALS.—Edinburgh and District Waterworks invite tenders for providing and delivering about 1,700 tons of dry sand, cast-iron pipes, and specials 30 in. in diameter. Copies of the specification and schedule may be obtained at the office of the engineer, Mr. W. A. Tait, C.E., 72a, George-street, Edinburgh, on payment of 1*l.* Tenders, endorsed "Tender for Contract No. 49," must be lodged with Mr. William Boyd, W.S., Clerk, Edinburgh and District Water Trust Offices, Edinburgh, not later than August 31.

SEPTEMBER 1.—**Loughton.**—GRANITE, ETC.—Loughton U.D.C. invite tenders for the supply of the following: Granite—300 tons, broken to 1½ in., delivered in quantities as desired, free at Loughton or Chigwell-lane Railway Stations (G.E.R.); gravel—500 yds. clean gravel, delivered at Loughton when and where required; boggin and destructor clinker—50 yds. of each, delivered to Loughton Station in 5-ton truck loads. Tenders, marked on the outside "Materials," must be delivered to Mr. J. H. Hayward, Clerk to the Council, Council Offices, Loughton, Essex, not later than 12 o'clock noon, September 1.

★ SEPTEMBER 12.—**Kingston-on-Thames.**—GRANITE.—The Corporation of Kingston-on-Thames invite tenders for 1,250 tons of Quenast, Guernsey, or other granite, suitable for road-making, the whole of such granite to be broken so as to pass through a ring having a 1¼-in. internal diameter. Tenders to be on forms obtained of the Borough Surveyor at the Municipal Offices, where samples must be left. Sealed tenders to Town Clerk, Kingston-on-Thames, by September 12.

NO DATE.—**Holme Cultram.**—ROAD METAL.—The Holme Cultram U.D.C. invite tenders for the supply of 800 tons of broken road metal in the months of October and November, as may be required by the surveyor. The quantities and places of delivery are as follows:—150 tons at Kirkbride Station; 150 tons at Abbey Junction Station; 500 tons at Abbey Town Station. If further particulars or information is required apply to Mr. R. Stubbs, Surveyor to the Council, Abbey Town.

Public Appointments.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*INSPECTOR OF BUILDINGS	Beckenham U.D.C.	130*l.* per annum rising to 160*l.*	Aug. 16
*ENGINEER'S ASSISTANT	York Corporation	120*l.* per annum	Aug. 31

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*PREMISES FOR BUILDER, DECORATOR, ETC.	Carwithen & Allen	Aug. 14
*CONTRACTOR'S PLANT, PLYMOUTH	Alfred Parkhouse	Sept. 4
*JOINERY WORKS, HENRY-STREET, GRAY'S INN-ROAD	May & Rowden	Oct. 3

Patents of the Week.

APPLICATIONS PUBLISHED.*

16,667 of 1905.—J. HENDERSON AND J. HENDERSON: *Method of Constructing Grates, Ranges, and Fireplaces in order to consume and economise Fuel.*

This relates to grates, ranges, and other fireplaces, and consists in constructing the same with one or more chambers or compartments at the rear of the back or sides thereof in order to form a combustion chamber into which the smoke and unburnt gases are made to pass and become consumed, and with a damper to cut off communication between the sides and bottom thereof and the top by closing the flue when required.

21,920 of 1905.—W. P. BULLIVANT and G. M. SELBY: *Locking Device for Bolts.*

This relates to a locking device for bolts, consisting of a piece hinged or pivoted to the head of the bolt and capable of being brought into contact with a part at or about right angles with the entrance of the bolt hole, and provided with an eccentric portion to lift the bolt when the device is turned into the unlocked position.

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

21,979 of 1905.—M. COCKBURN and A. MURPHY: *Kitchen Ranges.*

This relates to a kitchen range hood, comprising wings vertically pivoted at the sides of an opening in the back plate of the range and adapted to engage and support a flap horizontally hinged to the edge of the opening when they are turned outwards about their pivots, and means for turning them about their pivots by the movement of a pivoted handle or the like.

22,752 of 1905.—W. R. T. SINCLAIR: *Closet Cisterns and the like.*

This relates to closet cisterns and the like, and consists of a semicircular or like vessel mounted on trunnions near the top edge of the cistern. To one of the trunnions outside the cistern a long lever handle is mounted; the arm and handle are connected to each other by a link in such manner that on the lever handle being rotated on its pivot it serves to rotate and invert the said flushing vessel.

975 of 1906.—A. DIAT: *Window Frames.*

This relates to an incombustible and rigid window frame formed of a number of component metal or other bars applied to each other and to the masonry in such manner that each bar is capable of a free expansion on becoming heated, thereby preventing the fracture of the glass panes.

2,462 of 1906.—J. TUOHEY, D. W. GREIG, and W. E. FORSTER: *Windows having Sliding Sashes.*

This relates to windows having sliding sashes, and consists of means for locking the sashes in any desired position, said means comprising toothed racks arranged at the sides or ends of the sashes and disposed with their teeth opposite to each other, a double pawl adapted to be operated to engage and disengage said toothed racks and means for operating said double pawl.

5,831 of 1906.—S. REDFERN: *Screw-down Valves and the like.*

This relates to a small screw-down gun-metal valve with a body part, a bush with conical inner face, a nut, a packing ring, and a valve spindle, this latter being plain where it passes through the packing and screw threaded where it passes through the nut.

26,541 of 1905.—H. PENDLETON: *A Cramp Holder for use by Carpenters, Builders, and the like.*

This relates to a portable screw cramp for holding doors, window sashes, and the like when working on the same, comprising a foundation or base having lateral extensions with clamping means presented to a suitable abutment and passing through a fixed or stationary bracket situated upon the middle part of the top side thereof.

26,642 of 1905.—A. M. MACHUTCHEON and J. MACHUTCHEON: *Decorating of plain surfaced enamelled, Cast-iron Sanitary and other Ware.*

This relates to porcelain or vitreous enamelled cast-iron sanitary ware having designs or decorations produced on the surface by first enamelling with a ground colour of a one colour powdered enamel, and then, while still at fusing temperature, applying to the surface a powdered enamel or enamels of contrasting colours.

21,918 of 1905.—T. E. DEVONSHIRE: *Blocks and Slabs to be used in the construction of Floors and Ceilings.*

This relates to blocks or slabs to be used with flanged girders in the construction of floors and ceilings, the said blocks or slabs having at one end, beneath the part which is to rest on the flange of the girder, a metal-strengthened portion sufficient to extend beneath the whole or the greater part of the width of the flange of the girder, the other end of the said block or slab being without any such projection or with only a small projection beneath the part which is to rest on the flange of the girder, the projection or projections being provided to come against the edge of the lower flange of one of the supporting girders or the edges of the lower flanges of both girders.

3,386 of 1906.—DR. C. BORNER: *Apparatus for plastering or coating Walls and the like with Mortar.*

This relates to an apparatus for plastering or coating walls or the like with mortar, and consists in the combination of a receptacle to receive the mortar provided with a front wall provided with openings, a rotary plate mounted within such receptacle so that the said openings are in the path of the plate, a suitable number of racks, a toothed wheel to each of the latter carried by said receptacle, and a gearing to each such toothed wheel adapted to transmit motion from the latter to the said plate.

26,793 of 1905.—W. LE QUESNE: *Window Sashes.*

This relates to window sashes, and consists of means for securing the sides of the sashes opposite to the hinges, said means comprising rollers, vertical boxes, or recesses in the window frame formed with one or more openings, together with flanges formed upon the sashes and sides of the boxes or recesses respectively and designed to overlap.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

July 18.—By GILLART & SONS (at Machynlleth).
Cemmaes, etc., Montgomery.—Lord Harlech's Cemmaes Estates, comprising farms, lands, etc., 1,443 a., f. (in lots) £20,275

July 24.—By RIPPON, BOSWELL, & CO. (at Tiverton).
Rackenford, Devon.—"Canworthy Farm," 156 a. 0 r. 27 p., f. 925
"West Nutcott Farm," 112 a. 0 r. 15 p., f. 800
Various enclosures, 7 a. 0 r. 10 p., f. 357
Five freehold cottages, and 2 a. 2 r. 3 p. 275

July 25.—By A. G. & A. NOTLEY (at Lowestoft).
Mutford, Suffolk.—"The Red House Farm," 191 a. 3 r. 23 p., f., p. 3,000
"Marsh Lane Farm," 78 a. 2 r. 0 p., f., y.r. 65*l.* 1,100
House, blacksmith's shop, and 5 a. 2 r. 11 p., f. 163
Three freehold cottages, and 0 a. 3 r. 34 p. .. 100

July 26.—By SADLER & BAKER (at Camberley).
Camberley, Surrey.—Upper Gordon-rd., "Albuera" and "Nilestone," f., y.r. 110*l.* 1,500

By ROBERTS, SON, & TORY (at Sherborne).
Poyntington, Dorset.—The Poyntington Manor Estate, 971 a. 2 r. 37 p., f. 20,000

By DICKINSON, RIGGALL, & CO. (at Brigg).
Thornton-le-Moor, Lincs.—"Thornton Farm," 327 a., f., y.r. 250*l.* 4,350

July 28.—By WRIGHT & SCRUBY (at Cambridge).
Longstanton All Saints, Cambs.—"Bar" or "Barriers" Farm, 200 a. 2 r. 9 p., f., y.r. 200*l.* 3,500

July 30.—By BALCH & BALCH.
Chelsea.—36, Church-st. (s.), area 3,600 ft., f., p. 900
Camden Town.—7, Cantlowes-rd., u.t. 44 yrs., g.r. 7*l.*, p. 325
Holloway.—105, York-rd., u.t. 54½ yrs., g.r. 5*l.*, y.r. 61*l.* 2s. 370

By ELLIOTT, SON, & BOYTON.
Holloway.—Cottenham-rd., f.g.r. 14*l.* 7s., reversion in 48 yrs. 315

By E. J. GALE.
Southminster, Essex.—High-rd., A freehold meadow, 1 a. 0 r. 21 p., p. 180

By KEMSLEYS'
Rainham Creek, Essex.—Freehold factory land, 7½ acres 1,050

By T. B. WESTACOTT.
Regent's Park.—68 & 70, Park-rd. (s.), u.t. 15 yrs., g.r. 20*l.*, y.r. 106*l.* 575
Camden Town.—144, Great College-st. (s.), u.t. 60 yrs., g.r. 9*l.*, e.r. 60*l.* 415

By DILLEY, SON, & READ (at St. Ives).
Colne, Hunts.—Two freehold Closes, 7 a. 3 r. 37 p. 500

July 31.—By DEBENHAM, TEWSON, & CO.
Islington.—30, Alfred-st., u.t. 20 yrs., g.r. 5*l.*, y.r. 40*l.* 185
Hackney.—1 to 4, Exmouth-pl., f., w.r. 87*l.* 2s. 500
Mile End.—10 and 12, Ewing-st., u.t. 69 yrs., g.r. 10*l.* 10s., w.r. 37*l.* 14s. 400

By DREW & SON.
Sutton, Surrey.—131, 133, and 135, High-st. (s.), also blacksmith's shop in rear, area 6,100 ft., f., y.r. 210*l.* 3,550

Richmond, Surrey.—61 and 62, George-st. (bank premises), area 1,400 ft., f., y.r. 350*l.* £9,250

By C. W. DAVIES & SON.
King's Cross.—78, Winchester-st., u.t. 34½ yrs., g.r. 4*l.* 13s. 4d., w.r. 57*l.* 4s. 200
Islington.—74, St. Peter's-st., u.t. 30 yrs., g.r. 6*l.*, y.r. 44*l.* 280
Caledonian-road.—43, Freeling-st., u.t. 38 yrs., g.r. 5*l.*, w.r. 45*l.* 10s. 185
Stamford-hill.—24, Eastbourne-rd., u.t. 63¾ yrs., g.r. 6*l.*, e.r. 30*l.* 225

By MATTHEWS, MATTHEWS, & GOODMAN.
Hounslow, Middx.—9, 10, and 11, Castle-ter. (s.), f., y.r. 100*l.* 840

By PRICE, ARROW, & TAYLOR.
Balham.—12, Henderson-rd., u.t. 81 yrs., g.r. 10*l.*, y.r. 40*l.* 400

By RUTTERS'.
Bermondsey.—36 and 39, Willow-st., u.t. 17 yrs., g.r. 5*l.* 10s., w.r. 59*l.* 16s. 220

By THURGOOD & MARTIN.
Gray's Inn-road.—16, Pakenham-st., u.t. 35 yrs., g.r. 4*l.*, y.r. 32*l.* 280
Bethnal Green.—Harold-st., f.g.r. 22*l.*, reversion in 31½ yrs. 510
Tottenham.—Seaford-rd., f.g. rents 51*l.*, reversion in 76 yrs. 1,080

By HEPPER & SONS (at Leeds).
Hunslet, Yorks.—Pepper-rd., freehold engineering works, area 22,203 yds. 13,500

By ALFRED RICHARDS (at Tottenham).
Tottenham.—14, Bedford-rd., f., p. 545

By FLEURET, SONS, & ADAMS (at Masons' Hall Tavern).
Long Acre.—Betterton-st., the "Brownlow Arms" p.h., a freehold rental of 63*l.*, reversion in 20 yrs. 1,550

By GIDDY & GIDDY (at Swindon).
West Overton, etc., Wilts.—The Meux Estates (second portion), 8,185 a. 2 r. 20 p., f. (in numerous lots) 92,800

Aug. 1.—By G. HEAD & CO.
Maida Vale.—8, Randolph-gdns., u.t. 44¼ yrs., g.r. 10*l.*, y.r. 60*l.* 460

By ALFRED SAVILL & SONS.
Caddington, Beds.—"Chalk Farm," 99 a. 1 r. 39 p., f. 2,300
Markyate, Herts.—"Halfway House," f., y.r. 12*l.* 325
Enclosure of land, 1 a. 0 r. 16 p., f. 100
Ashey, Isle of Wight.—"Great Upton Farm," 42 a. 2 r. 29 p., f. 2,500
Freehold Brick Works, and 18 a. 2 r. 39 p. .. 900
Enclosures of land, 23 a. 0 r. 2 p., f. 850

By E. & S. SMITH.
Holloway.—113, Hornsey-rd., u.t. 32½ yrs., g.r. 6*l.* 6s., y.r. 32*l.* 200

August 2.—By FAREBROTHER, ELLIS, & CO.
Wandsworth.—40 and 42, Birdhurst-rd., u.t. 76 yrs., g.r. 10*l.*, w.r. 65*l.* 465
Camden Town.—Park-st., f.g. rents 21*l.* 19s., reversion in 11 yrs. 5,180

By GALE & THWAITES.
Mile End.—13, Beaumont-st. (s.), u.t. 22 yrs., g.r. 5*l.* 4s., y.r. 40*l.* 285

By NEWBON, SHEPHARD, & EDWARDS.
Balls Pond.—134, Balls Pond-rd. (with stabling and yard), u.t. 45½ yrs., g.r. 7*l.* 7s., y.r. 55*l.* 380
Holloway.—24, Sussex-rd., u.t. 46 yrs., g.r. 5*l.* 5s., e.r. 34*l.* 250
Finsbury Park.—38, 40, 55, and 57, Hertimage-rd., u.t. 77 yrs., g.r. 26*l.*, y.r. 134*l.* 690
Clapham.—67 to 73 (odd), Manor-st., f., y.r. 124*l.* 1,550

By JOSEPH STOWER.
Camberwell.—Denmark-rd., f.g.r. 25*l.*, reversion in 32 yrs. 570
Dulwich.—136, Rosendale-rd., u.t. 84 yrs., g.r. 10*l.* 10s., y.r. 55*l.* 510

By C. SPARROW & SON.
Whetstone.—High-rd., freehold house and shop, y.r. 50*l.* 720

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. beerhouse; p.h. for public-house; o. for office; s. for shops; ct. for court.

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications; and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples, sent to or left at this office, unless he has specially asked for them.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance. The Editor cannot undertake to read and consider articles offered for acceptance unless they are type-written.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.	
Hard Stocks	1 10 0	per 1000 alongside, in river.
Rough Stocks and Grizzles	1 7 0	„ „ „
Picked Stocks for Facings	2 17 6	„ delivered
Flettons	1 8 0	„ at railway depôt.
Red Wire Cuts	1 14 0	„ „ „
Best Fareham Red	3 12 0	„ „ „
Best Red Pressed Ruabon Facing..	5 0 0	„ „ „
Best Blue Pressed Staffordshire	3 15 0	„ „ „
Do. Bullnose	4 0 0	„ „ „
Best Stourbridge Fire Bricks	3 14 0	„ „ „
GLAZED BRICKS.		
Best White and Ivory Glazed Stretchers	12 0 0	„ „ „
Headers	11 0 0	„ „ „
Quoins, Bullnose, and Flats	16 0 0	„ „ „
Double Stretchers	19 0 0	„ „ „
Double Headers	16 0 0	„ „ „
One Side and two Ends	19 0 0	„ „ „
Two Sides and one End	20 0 0	„ „ „
Splays, Chamferred, Squints..	20 0 0	„ „ „
Best Dipped Salt Glazed Stretchers, and Header.	12 0 0	„ „ „
Quoins, Bullnose, and Flats	14 0 0	„ „ „
Double Stretchers	15 0 0	„ „ „
Double Headers	14 0 0	„ „ „
One Side and two Ends	15 0 0	„ „ „
Two Sides and one End	15 0 0	„ „ „
Splays, Chamferred, Squints..	14 0 0	„ „ „
Second Quality White and Dipped Salt Glazed	3 0 0	„ less than best.

	s. d.	
Thames and Pit Sand	7 0	per yard, delivered.
Thames Ballast	5 6	„ „
Best Portland Cement	27 0	per ton, „
Best Ground Blue Lias Lime	19 0	„ „

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 11s. 6d. per yard, delivered.
Stourbridge Fireclay in sacks 27s. 0d. per ton at rly. dpt.

STONE

	s. d.	
BATH STONE—delivered on road waggons, Paddington Depôt	1 6½	per ft. cube.
Do. do. delivered on road waggons, Nine Elms Depôt	1 8½	„ „
PORTLAND STONE (20 ft. average)—Brown Whitbed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf...	2 1	„ „
White Basebed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf...	2 2½	„ „

	s. d.	
Ancaster in blocks	1 10	per ft. cube, deld. rly. depôt.
Beer „	1 6	„ „
Greenshill „	1 10	„ „
Darley Dale in blocks	2 4	„ „
Red Corsehill „	2 2	„ „
Closeburn Red Freestone	2 0	„ „
Red Mansfield „	2 4	„ „
YORK STONE—*Robin Hood Quality.*		
Scappled random blocks.	2 10	„ „
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 3	per ft. super., „
6 in. rubbed two sides ditto, ditto	2 6	„ „
3 in. sawn two sides slabs (random sizes)	0 11½	„ „
2 in. to 2½ in. sawn one side slabs (random sizes)	0 7½	„ „
1½ in. to 2 in. ditto, ditto	0 6	„ „
HARD YORK—		
Scappled random blocks.	3 0	per ft. cube, „
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 8	per ft. super., „
6 in. rubbed two sides ditto	3 0	„ „
3 in. sawn two sides slabs (random sizes)	1 2	„ „
2 in. self-faced random flags	0 5	„ „

	s. d.	
Hopton Wood (Hard Bed) in blocks	2 0	per ft. cube, deld rly. depôt.
„ „ „ 6 in. sawn both sides landings	2 7	per ft. super. deld. rly. depôt.
„ „ „ 3 in. sawn both sides random slabs	1 0	„ „
„ „ „ 2 in. do.	0 8½	„ „

SLATES.

In. In.		£ s. d.	
20×10 best blue Bangor		13 2 6	per 1000 of 1200 at r. d.
20×12	,, ,,	13 17 6	,, ,,
20×10 first quality	,,	13 0 0	,, ,,
20×12	,, ,,	13 15 0	,, ,,
16×8	,, ,,	7 5 0	,, ,,
20×10 best blue Portmadoc		12 12 6	,, ,,
16×8	,, ,,	6 12 6	,, ,,
20×10 best Eureka unfading green		15 17 6	,, ,,
20×12	,, ,, ...	18 7 6	,, ,,
18×10	,, ,, ...	13 5 0	,, ,,
16×8	,, ,, ...	10 5 0	,, ,,
20×10 permanent green		11 12 6	,, ,,
18×10	,, ,,	9 12 6	,, ,,
16×8	,, ,,	6 12 6	,, ,,

TILES.

	s. d.	
Best plain red roofing tiles...	42	0 per 1000 at rly. depôt.
Hip and Valley tiles ...	3	7 per doz. ,,
Best Broseley tiles ...	50	0 per 1000 ,,
Do. Ornamental tiles ...	52	6 ,, ,,
Hip and Valley tiles ...	4	0 per doz. ,,
Best Ruabon red, brown, or brindled do. (Edwards) ...	57	6 per 1000 ,,
Do. Ornamental do. ...	60	0 ,, ,,
Hip tiles ...	4	0 per doz. ,,
Valley tiles ...	3	0 ,, ,,
Best Red or Mottled Staffordshire do. (Peakes) ...	51	9 per 1000 ,,
Do. Ornamental do. ...	54	6 ,, ,,
Hip tiles ...	4	1 per doz. ,,
Valley tiles ...	3	8 ,, ,,
Best "Rosemary" brand plain tiles ...	48	0 per 1000 ,,
Best Ornamental tiles ...	50	0 ,, ,,
Hip tiles ...	4	0 per doz. ,,
Valley tiles ...	3	8 ,, ,,
Best "Hartshill" brand plain tiles, sand-faced ...	50	0 per 1000 ,,
Do pressed ...	47	6 ,, ,,
Do. Ornamental do. ...	50	0 ,, ,,
Hip tiles ...	4	0 per doz. ,,
Valley tiles ...	3	6 ,, ,,

WOOD.

Building Wood.	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in. ...	13 10 0	... 15 0 0
Deals: best 3 by 9 ...	13 0 0	... 14 0 0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11 0 0	... 12 0 0
Battens: best 2½ by 6 and 3 by 6...	0 10 0	less than 7 in. and 8 in.
Deals: seconds ...	1 0 0	less than best.
Battens: seconds ...	0 10 0	,, ,,
2 in. by 4 in. and 2 in. by 6 in....	9 0 0	... 10 0 0
3 in. by 4½ in. and 2 in. by 5 in...	8 10 0	... 9 10 0
Foreign Sawn Boards—		
1 in. and 1¼ in. by 7 in. ...	0 10 0	more than battens.
¾ in. ...	1 0 0	,,

	At per load of 50 ft.	
Fir timber: best middling Danzig or Memel (average specification)	4 10 0	... 5 0 0
Seconds ...	4 0 0	... 4 10 0
Small timber (8 in. to 10 in.) ...	3 12 6	... 3 15 0
Small timber (6 in. to 8 in.) ...	3 0 0	... 3 10 0
Swedish balks ...	2 10 0	... 3 0 0
Pitch-pine timber (30 ft. average)	4 0 0	... 4 15 0

Joiners' Wood.	At per standard.	
White Sea: first yellow deals, 3 in. by 11 in. ...	24 0 0	... 25 0 0
3 in. by 9 in. ...	22 0 0	... 23 0 0
Battens, 2½ in. and 3 in. by 7 in.	6 10 0	... 18 0 0
Second yellow deals, 3 in. by 1 in.	18 10 0	... 20 0 0
,, ,, 3 in. by 9 in.	17 10 0	... 19 0 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	... 14 10 0
Third yellow deals, 3 in. by 11 in. and 9 in. ...	13 10 0	... 15 0 0
Battens, 2½ in. and 3 in. by 7 in.	11 0 0	... 12 0 0
Petersburg first yellow deals, 3 in. by 11 in. ...	21 0 0	... 22 10 0
Do. 3 in. by 9 in. ...	18 0 0	... 19 10 0
Battens ...	13 10 0	... 15 0 0
Second yellow deals, 3in. by 11in.	16 0 0	... 17 0 0
Do. 3 in. by 9 in. ...	14 10 0	... 16 0 0
Battens ...	11 0 0	... 12 10 0
Third yellow deals, 3 in. by 11 in. ...	13 0 0	... 14 0 0
Do. 3 in. by 9 in. ...	12 10 0	... 14 0 0
Battens ...	10 0 0	... 11 0 0
White Sea and Petersburg—		
First white deals, 3 in. by 11 in.	14 10 0	... 15 10 0
,, ,, 3 in. by 9 in.	13 10 0	... 14 10 0
Battens ...	11 0 0	... 12 0 0
Second white deals, 3 in. by 11 in.	13 10 0	... 14 10 0
,, ,, 3 in. by 9 in.	12 10 0	... 13 10 0
,, ,, battens ...	10 0 0	... 11 0 0
Pitch-pine: deals ...	18 0 0	... 21 0 0
Under 2 in. thick extra ...	0 10 0	... 1 0 0
Yellow Pine—First, regular sizes	44 0 0	upwards.
Oddments ...	32 0 0	,,
Seconds, regular sizes ...	33 0 0	,,
Yellow Pine oddments ...	28 0 0	,,
Kauri Pine—Planks, per ft. cube..	0 3 6	... 0 5 0
Danzig and Stettin Oak Logs— Large, per ft. cube ...	0 3 0	... 0 3 6
Small ,, ,, ...	0 2 6	... 0 2 9
Wainscot Oak Logs, per ft. cube..	0 5 6	... 0 6 0
Dry Wainscot Oak, per ft. sup. as inch...	0 0 8½	... 0 0 9½
¾ in. do. do ...	0 0 7	... —
Dry Mahogany—Honduras, Tabasco, per ft. super. as inch ...	0 0 9	... 0 1 0
Selected, Figury, per ft. super. as inch ...	0 1 6	... 0 2 6
Dry Walnut, American, per ft. super. as inch ...	0 0 10	... 0 1 0
Teak, per load ...	17 0 0	... 22 0 0
American Whitewood Planks, per ft. cube ...	0 4 0	... 0 5 0

Prepared Flooring, etc.—	Per square.	
1 in. by 7 in. yellow, planed and shot ...	0 13 6	... 0 17 6
1 in. by 7 in. yellow, planed and matched ...	0 14 0	... 0 18 0
1¼ in. by 7 in. yellow, planed and matched ...	0 16 0	... 1 0 0

WOOD (continued).

Joiners' Wood (continued)— Prepared Flooring, etc. (continued)—	Per square. £ s. d.	£ s. d.
1 in. by 7 in. white, planed and shot ...	0 12 0	... 0 14 0
1 in. by 7 in. white, planed and matched ...	0 12 6	... 0 15 0
1¼ in. by 7 in. white, planed and matched ...	0 15 0	... 0 16 6
¾ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0 11 0	... 0 13 6
1 in. by 7 in. ,, ,,	0 14 0	... 0 18 0
¾ in. by 7 in. white ,, ,,	0 10 0	... 0 11 6
1 in. by 7 in. ,, ,, ,,	0 12 9	... 0 15 0
6 in. at 6d. to 9d. per square less than 7 in.		

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections ...	7 0 0	... 7 10 0
Compound Girders, ordinary sections ...	9 0 0	... 10 0 0
Steel Compound Stanchions ...	12 0 0	... 13 0 0
Angles, Tees, and Channels, ordinary sections ...	9 0 0	... 10 0 0
Flitch Plates ...	9 0 0	... 10 0 0
Cast Iron Columns and Stanchions including ordinary patterns...	7 10 0	... 8 10 0

METALS.

	Per ton, in London. £ s. d.	£ s. d.
Iron—		
Common Bars ...	8 0 0	... 8 10 0
Staffordshire Crown Bars, good merchant quality ...	8 10 0	... 9 0 0
Staffordshire "Marked Bars"...	10 10 0	... —
Mild Steel Bars...	8 15 0	... 9 0 0
Hoop Iron, basis price ...	9 5 0	... 9 10 0
,, ,, Galvanised ...	17 0 0	... —
(*And upwards, according to size and gauge.)		
Sheet Iron Black—		
Ordinary sizes to 20 g. ...	9 10 0	... —
,, ,, 24 g. ...	10 10 0	... —
,, ,, 26 g. ...	12 0 0	... —
Sheet Iron, Galvanised, flat, best quality—		
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g. ...	14 0 0	... —
Ordinary sizes to 22 g. and 24 g.	14 10 0	... —
,, ,, 26 g. ...	15 0 0	... —
Sheet Iron, Galvanised, flat, best quality—		
Ordinary sizes to 20 g. ...	17 0 0	... —
,, ,, 22 g. and 24 g.	17 10 0	... —
,, ,, 26 g. ...	19 0 0	... —
Galvanised Corrugated Sheets—		
Ordinary sizes 6 ft. to 8 ft. 20 g.	14 0 0	... —
,, ,, 22 g. and 24 g.	14 10 0	... —
,, ,, 26 g. ...	15 15 0	... —
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker ...	11 10 0	... —
Best Soft Steel Sheets, 22 g. & 24 g.	12 10 0	... —
,, ,, ,, 26 g. ...	14 15 0	... —
Cut Nails, 3 in. to 6 in. ...	9 10 0	... 9 15 0
(Under 3 in., usual trade extras.)		

LEAD, &c.

	Per ton, in London. £ s. d.	£ s. d.
Lead—Sheet, English, 3lb. and up.	19 7 6	... —
Pipe in coils ...	19 17 6	... —
Soil pipe ...	22 7 6	... —
Compo pipe...	22 7 6	... —
Zinc—Sheet—		
Vieille Montagne ...ton	33 0 0	... —
Silesian...	32 15 0	... —
Copper—		
Strong Sheet ...per lb.	0 1 1	... —
Thin ,, ... ,,	0 1 2	... —
Copper nails ... ,,	0 1 0	... —
Brass—		
Strong Sheet ... ,,	0 1 0	... —
Thin ,, ... ,,	0 1 1	... —
Tin—English Ingots ... ,,	0 1 9	... —
Solder—Plumbers' ... ,,	0 0 8½	... —
Tinmen's... ,,	0 0 10½	... —
Blowpipe... ,,	0 0 11½	... —

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.

15 oz. thirds ...	2¾d. per ft. delivered.
,, fourths ...	1¾d. ,, ,,
21 oz. thirds ...	3¾d. ,, ,,
,, fourths ...	2¾d. ,, ,,
26 oz. thirds ...	4¼d. ,, ,,
,, fourths ...	3¼d. ,, ,,
32 oz. thirds ...	5d. ,, ,,
,, fourths ...	4¼d. ,, ,,
Fluted Sheet, 15 oz...	3¾d. ,, ,,
,, 21 oz...	4¼d. ,, ,,

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.

¼ Hartley's ...	2¼d. per ft. delivered.
⅛ ,, ...	2¼d. ,, ,,
⅛ ,, ...	3d. ,, ,,
Figured and Oxford Rolled "Oceanic" Glass, white ...	4d. ,, ,,
Do. ,, tinted ...	5¼d. ,, ,,

OILS, &c.

		£ s. d.
Raw Linseed Oil in pipes ...	per gallon	0 1 10
,, ,, ,, in barrels ...	,,	0 1 11
,, ,, ,, in drums ...	,,	0 2 1
Boiled ,, ,, in pipes ...	,,	0 2 0
,, ,, ,, in barrels ...	,,	0 2 1
,, ,, ,, in drums ...	,,	0 2 3
Turpentine in barrels ...	,,	0 3 8
,, in drums ...	,,	0 3 10
Genuine Ground English White Lead	per ton	22 10 0
Red Lead, Dry ...	,,	21 10 0
Best Linseed Oil Putty ...	per cwt.	0 7 0
Stockholm Tar ...	per barrel	1 12 0

VARNISHES, &c.

	Per gallon. £ s. d.
Fine Pale Oak Varnish ...	0 8 0
Pale Copal Oak ...	0 10 6
Superfine Pale Elastic Oak ...	0 12 6
Fine Extra Hard Church Oak...	0 10 0
Superfine Hard-drying Oak, for seats of Churches ...	0 14 0
Fine Elastic Carriage ...	0 12 6
Superfine Pale Elastic Carriage ...	0 16 0
Fine Pale Maple ...	0 16 0

VARNISHES, &c. (continued).

	Per gallon £ s. d.
Finest Pale Durable Copal ...	0 18 0
Extra Pale French Oil ...	1 1 0
Eggshell Flatting Varnish ...	0 18 0
White Copal Enamel ...	1 4 0
Extra Pale Paper ...	0 12 0
Best Japan Gold Size ...	0 10 6
Best Black Japan ...	0 16 0
Oak and Mahogany Stain ...	0 9 0
Brunswick Black ...	0 8 6
Berlin Black ...	0 16 0
Knotting ...	0 10 0
French and Brush Polish ...	0 10 0

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TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays*. [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

* Denotes *accepted*. † Denotes *provisionally accepted*.

ABERDEEN.—For widening Union Bridge, for the Town Council. Mr. W. Dyack, Burgh Surveyor, Aberdeen:—

G. Hall, Aberdeen ... £6,518 2 11

CLEETHORPES.—For extensions of the Wesleyan Church Sunday-schools, for the Trustees of Wesleyan Church. Mr. H. C. Scaping, architect, Court-chambers, Grimsby:—

T. Wilkinson, High Gate, Cleethorpes* .. £2,378

CHURCH (Lancashire).—For erecting a fire-engine station, for the Urban District Council. Mr. W. E. Wood, Surveyor, Council Offices, Church. Quantities by Surveyor:—

Mason: H. Ramsbottom, Accrington.. } As per schedule of prices.
Joiner: R. S. Duxbury, Oswaldtwistle
Plumber: J. R. Sudall, Oswaldtwistle
Heating Apparatus: J. H. Bury, Oswaldtwistle ...
Plasterer: J. Barnes, Accrington.....
Slater: W. Green, Clayton-le-Moors ..

DARTFORD.—For structural alterations to the laundries at Darenth Asylum, for the Metropolitan Asylums Board. Mr. W. T. Hatch, Engineer-in-Chief:—

W. Hussey ...	£1,920	T. Knight, Crayb r o o k e Works, Sidcup* ...	£1,916
Friday & Ling	1,799		
J. Ellingham & Sons	1,693		

DARTFORD.—For building cesspool and constructing new drainage for four cottages, etc., Gore Farm Hospital, for the Metropolitan Asylums Board. Mr. W. T. Hatch, Engineer-in-Chief:—

W. H. Wheeler	£249 0 0	W. Hussey	£217 0 0
G. Gwyn	248 0 0	Road Maintenance & Stone	
Gardner & Hazell	247 10 0		
H. J. Smith & Son	229 18 0	Supply Co.,	
T. Knight.....	225 0 0	Ltd., Graves-	
J. Ellingham & Sons	223 0 0	end*	199 19 9

DARTFORD.—For cleaning and painting works at Joyce Green Smallpox Hospital, for the Metropolitan Asylums Board. Mr. W. T. Hatch, Engineer-in-Chief:—

E. Proctor & Son ..	£175	W. J. Simms & Sons,	
W. Hussey	167	160, Derby-road, Nottingham*	£150

DARTFORD (Kent).—For engineering alterations to laundries at Darenth Asylum, for the Metropolitan Asylums Board. Mr. W. T. Hatch, Engineer-in-Chief:—

W. G. Cannon & Sons ...	£4,484 14 4
Cannon & Hefford ...	3,768 0 0
Summerscales & Sons ...	3,634 0 0
W. Weeks & Sons...	3,514 7 6
J. & F. May ...	3,396 0 0
Death & Ellwood ...	3,104 0 0
T. Potter & Sons ...	2,998 0 0
D. & J. Tullis, 1, Southwark Bridge-buildings* ...	2,885 0 0

HEREFORD.—For erecting a block of cottages, Gwynne-street, for Mrs. Lucy Dutton. Messrs. Groome & Bettington, architects and surveyors, Palace-chambers, King-street, Hereford:—

Bowers & Co. ..	£1,060 0	W. Powell.....	£998 0
C. Cooke	1,045 0	T. Hiles.....	994 10
E. W. Wilks....	1,037 10	R. Taylor*	950 0
J. T. Jones	1,005 0		

[All of Hereford.]

ISLEWORTH.—For iron staircase, verandas, etc., to be erected in buildings in progress, for Brentford Guardians. Mr. W. H. Ward, architect, Paradise-street, Birmingham:—

Iron Staircase, Verandas, etc.

H. & C. Davis & Co., Ltd., 1, Tne Pavement, Clapham, S.W. ... £1,495

Electric Wiring, etc.

Reynolds & Co., George-street, Richmond £730

KING'S HEATH.—For making good of Woodville road, for King's Norton and Northfield Urban Distric Council. Mr. A. W. Cross, Engineer and Surveyor, 23 Valentine-road, King's Heath:—

A. E. Palmer ..	£331 4 6	J. White, Jun.,	
J. Hunt & Sons	321 10 1	Handsworth*	£248 3 4

KING'S HEATH.—For erecting six homes for epileptics on the Monyhull Hall Estate near King's Heath, for Birmingham, Aston, and King's Norton Joint Poor Law Establishment Committee. Messrs. C. Whitwell & Son, architects to the Committee, Newhall-street, Birmingham. Quantities partly by Mr. J. L. Williams, Temple-row, Birmingham, and partly by Mr. T. Jones, Warwick-chambers, Corporation-street, Birmingham:—

T. Rowbotham, Coventry-road, Birmingham £20,775

[Fifteen builders tendered.]

LONDON.—For making, testing, and delivering of sluice valves, etc., Fortis Green reservoirs, for the Metropolitan Water Board. Mr. W. B. Bryan, Chief Engineer:—

Glenfield & Kennedy	£1,287 8
J. Blakeborough & Sons, Brighouse, Yorks*	1,092 8

LONDON.—For making, testing, and delivering sluice valves, aqueduct, Child's Hill to Cranley-gardens, for the Metropolitan Water Board. Mr. W. B. Bryan, Chief Engineer:—

Glenfield & Kennedy	£1,158 14 3
J. Blakeborough & Sons, Brighouse, Yorks*	1,039 19 0

MARKET HARBOROUGH.—For Baptist church. Messrs. G. Baines & Son, architects, 5, Clement's-inn, Strand, London, W.C.:—

W. Lawrence & Son	£2,744 0 0	A. P. Hawtin	£2,270 0 0
G. E. Wallis & Son	2,632 0 0	G. Henson & Son	2,257 0 0
Linnell & Son	2,618 3 6	T. Hickman	2,237 10 0
Battley, Sons, & Holness	2,347 0 0	H. Green	2,180 0 0
Clark & Parrett	2,340 0 0	A. J. Chown	2,094 18 6
T. Herbert	2,335 0 0	H. Herbert & Sons, Millstone-lane, Leicester‡	2,050 0 0
E. Brown & Son	2,330 0 0		

‡ Accepted with modifications.

NORWICH.—For new boiler-house and seatings for boilers, for the Norwich Board of Guardians at Norwich Workhouse. Messrs. Morgan & Buckingham, architects and surveyors, 3, Bedwell-street, Norwich:—

Podd & Fisher	£1,146 0	W. J. Hannant	£1,057 0
F. R. Hipperson	1,100 7	A. C. Taylor	999 0
Boddy & Son	1,085 0	Coleman	998 0
Downing & Sons	1,074 10	Greengrass	996 0
G. G. Stowers	1,060 0	A. S. Lincoln*	980 0

[All of Norwich.]

PRITTLEWELL.—For the erection of a grand stand at the club ground, West-street, Prittlewell, Southend-on-Sea, for the Southend United Football Club, Ltd. Mr. C. Cooke, architect, Southend-on-Sea:—

Pinchon & Packer	£448 10 0	J. Seller & Co.	£383 19 5
J. Carter	430 0 0	A. Ducat*	325 0 0
F. & E. Davey, Ltd.	395 0 0	A. R. Whur	320 0 0
		J. C. Flaxman	238 0 0

[All of Southend-on-Sea.]

RICKMANSWORTH.—For 600 yds. of stoneware pipe sewer, etc., in Copthorne-road, for the Urban District Council. Mr. A. Freeman, Surveyor, Church-street, Rickmansworth. Quantities by Surveyor:—

R. W. Swaker	£1,039 5 5	A. F. Lee	£517 3 0
D. Bone	613 12 6	G. G. Rayner	500 0 0
T. Free & Sons	580 1 4	Beeson & Sons, Rickmansworth*	488 5 4
G. R. Mann	565 17 5		
Hardy & Bate	521 12 0		

SEISDON.—For erecting a new building at the Trysull Workhouse for children's nursery, for the Guardians:—

R. Kidson, Cleveland-street, Wolverhampton* £193

[Five other competitors.]

SUTTON (Surrey).—For stabling and other buildings on the Belmont Asylum estate, for the Metropolitan Asylums Board. Messrs. T. W. Aldwinckle & Son, architects, 20, Denman-street, London Bridge, S.E.:—

T. Pearce	£7,818 10 0	J. B. Potter	£5,617 0 0
G. Potter	6,793 10 0	W. Lawrence & Son	5,384 0 0
T. Cole	6,281 8 4	W. Moss & Sons, Ltd.	5,377 0 0
G. Parker	6,279 0 0	J. & M. Patrick	5,199 0 0
Marriott & Salter	6,250 0 0	E. Streather	4,978 0 0
Potter Bros.	6,213 0 0	J. & W. Drake, 195, Hammersmith-road, W., and Willesden Green*	4,912 10 0
W. Johnson & Co., Ltd.	6,104 0 0		
A. M. Coles	6,094 8 11		
F. J. Shopland	5,947 0 0		
H. Lovatt, Ltd.	5,900 0 0		
F. G. Minter	5,783 0 0		

ROMFORD.—For supplying and fixing granite kerb, Hornchurch, Rainham, and Upminster, for the Rural District Council. Mr. G. Lapwood, Surveyor, Victoria-road, Romford:—

T. C. Thompson	£189 18 9	Wilson, Border, & Co.	£175 0 0
D. T. Jackson	186 4 5	F. G. Porter	166 0 6
B. W. Glenny	180 12 6	T. W. Marsh	165 1 0
W. Griffiths & Co., Ltd.	178 16 7	H. F. White	165 0 0
Hewett & Sons, Ltd.	177 0 0	R. A. Bonnett, Chelmsford*	145 16 8

SUTTON.—For installation of electric lighting at the Downs School, Banstead-road, for the Metropolitan Asylums Board. Mr. W. T. Hatch, Engineer-in-Chief:—

E. P. Allam & Co.	£3,985 10 0	Sweet Bros.	£2,673 3 1
Ward, Barker, & Co.	3,650 0 0	L. Sunderland & Co.	2,655 0 0
Jackson Bros.	3,523 0 0	R. Cort & Son	2,651 0 0
Eastlakes, Ltd.	3,365 0 0	Cowtan & Sons	2,650 0 0
Warren, Smith, & Co.	2,994 0 0	J. Barker & Co.	2,646 7 0
F. A. Glover & Co.	2,958 0 0	Mann, Egerton, & Co.	2,642 13 9
Buchanan & Curwen	2,950 0 0	Coleby & Co.	2,625 0 0
Western Engineering Co.	2,935 0 0	Tamplin & Makoyski	2,555 0 0
Electrical Engineering & Maintenance Co.	2,892 0 0	Lund Bros. & Co.	2,550 0 0
Army and Navy Auxiliary Co-operative Supply	2,885 0 0	Smeeton & Page	2,545 9 6
F. Suter & Co.	2,791 0 0	Bromley, Batstone, & Kirk	2,498 16 0
		T. Potter & Sons	2,493 0 0
		T. Hiscock	2,469 0 0
		Dargue, Griffiths, & Co., 51, North John-street, Liverpool*	2,407 0 0

WEALDSTONE.—For making up, etc., Bruce-road, for the Urban District Council. Mr. H. Walker, Surveyor, Council Offices, Peel-road, Wealdstone:—

A. F. Lee	£268 13 3	Bower Bros.	£223 5 10
Hardy, Bate, & Co.	247 9 10	G. R. Mann	216 16 9
J. & W. Drake	243 0 0	A. B. Champniss, Wealdstone*	208 11 4
T. Free & Son	242 12 1	A. Wooster	171 13 9
T. Adams	233 3 7		

WOLVERHAMPTON.—For additions to the administrative block at the fever hospital in Green-lane, for the Health Committee. Mr. G. Green, Borough Engineer, Wolverhampton:—

F. Tomkinson	£2,231	F. L. Jones	£1,658
R. Kidson	1,949	G. Cave & Son	1,585
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J. Herbert	1,660	H. Gough & Son*	1,490
T. & S. Ham	1,660		

[All of Wolverhampton.]

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